







22900202797











HARDWICKE'S  
SCIENCE - GOSSIP

FOR 1870.







HARDWICKE'S

# Science=Gossip:

AN ILLUSTRATED MEDIUM OF INTERCHANGE AND GOSSIP

FOR STUDENTS AND

## LOVERS OF NATURE.

EDITED BY M. C. COOKE, M.A.

AUTHOR OF "HANDBOOK OF BRITISH FUNGI," "A PLAIN AND EASY ACCOUNT OF THE BRITISH FUNGI," "MICROSCOPIC FUNGI," "A MANUAL OF BOTANICAL TERMS," AND OF "STRUCTURAL BOTANY," THE "BRITISH REPTILES," ETC. ETC.



LONDON:

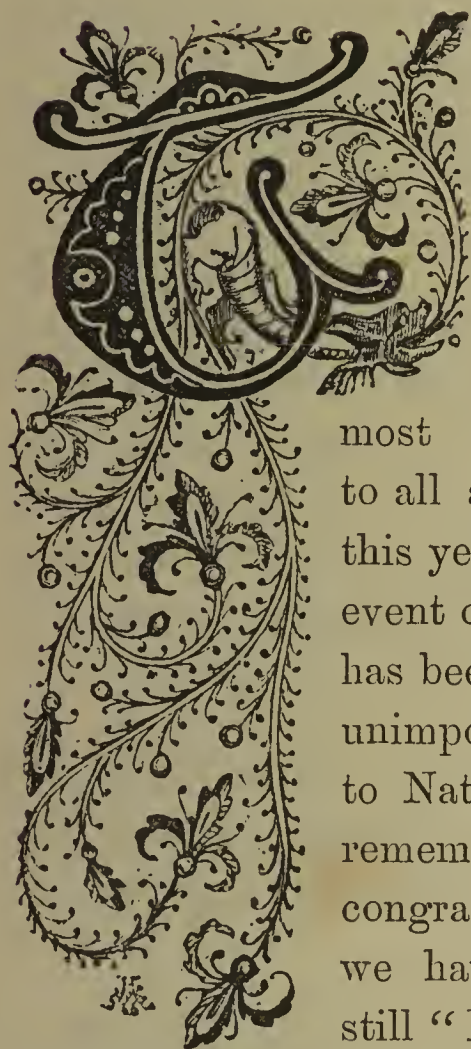
ROBERT HARDWICKE, 192, PICCADILLY.

1871.

WYMAN AND SONS,  
ORIENTAL, CLASSICAL, AND GENERAL PRINTERS,  
GREAT QUEEN STREET, LONDON, W.C.

WELLCOME INSTITUTE LIBRARY	
Coll.	welMomec
Call	ser
No.	Q1
	/016

## A V A N T - P R O P O S .



THE eventful year One Thousand Eight Hundred and Seventy is near its close. In the history of many nations of Europe it will long stand prominent as one of the most important years during the century. To some it has been a year of success; to others a year of failure; to most a year of privation, pain, and excitement, to all a year not soon to be forgotten. The close of this year is also the close of our Sixth Volume, a small event compared with the great ones to which allusion has been made, still to us and our readers not altogether unimportant. The sixth volume of a Journal devoted to Natural History is nowadays something worthy of remembrance, an event to be proud of; therefore we congratulate all our readers, especially those with whom we have gossiped from 1865 to 1870, that they are still "Lovers of Nature," and that we continue to provide for them "an Illustrated Medium of Interchange and Gossip."

As we spread open our six volumes before us, shall we say with their million of facts?—perhaps so—with their fifteen hundred illustrations, with their fifteen hundred and upwards of pages of information, we cannot but think that there are many who also congratulate *us*, and who feel that we deserve their congratulations for our successes rather than condemnation for our failures. It can hardly be supposed that nobody condemns us—we never dreamt such a pleasant dream as that of pleasing everybody—and we have never flattered ourselves on having attained perfection; all we lay claim to is—that we have honestly endeavoured to do our best to achieve success and merit approval, so that, failing, we might fail with a clear conscience.

It would be base ingratitude in us to forget, at such a time as this, how much we are indebted to others, and how highly we esteem all the



## AVANT-PROPOS.

---

help so freely given. The contributors who from time to time fill the sixteen pages devoted to "Articles," the correspondents who supply monthly little facts in Zoology, Botany, or Microscopy; those who ask questions and those who answer them in our Notes and Queries; and last, not least, those good friends and true who identify and name the specimens sent to us for that purpose, and perform labours sometimes calling for the sacrifice of much valuable time with scarce any recognition but the initials following the names of mosses, lichens, ferns, seaweeds, beetles, flies, bees, bugs, mites, spiders, &c. &c., in our "Answers to Correspondents," — these, and all of these, have our heartiest thanks, and for them especially we desire "a Merry Christmas and a Happy New Year."

There are doubtless many others who deserve our thanks; those who praise, and those who condemn us; those who recommend us, or help to make our journal known; those who cheer and encourage us; and those who point out our faults. To each and all of these we proffer thanks; it is all we have to give, but we give it freely, with the hope that for many years they may continue to enjoy health and strength to persevere in the same good work.

Thus much for the past, but what of the future? Hitherto we have always abstained from promises, knowing how dangerous it is to make promise for the future. All we can venture to write on this subject is to express a hope that we shall not be found wanting at the close of the Seventh Volume in any of the merits, but deficient in all the failings of the sixth. If all those who have for six years done so much to help us continue their efforts, and exert their influence with others, we cannot doubt for the future. Under such conditions, our seventh will be our most successful year, and, with faith in such a prospect, we shall

Not come for one, but come for many,  
Many and many a happy year.

## LIST OF ILLUSTRATIONS.

ABNORMAL PLANTAIN, 37.  
*Abraxas grossulariata*, Egg of, 253.  
*Achelia*, &c., 26-30.  
*Achnanthes inflata*, 62.  
*Anus crecca*, 36.  
*Anceus maxillaris*, Head of, 200.  
*Anomalina coronata*, 11.  
*Anomodon attenuatus*, 83.  
Ant-lion, the Larva of, 87.  
*Arum maculatum*, spathe, pistils, &c., 74, 75, 76.  
*Astrophyton verrucosum*, 150.  
*Aulacodiscus Kittoni*, 55.  
*Auliscus*, 55.  
Australian Crane, Parasite's Egg, 132.

BEE, ABDOMEN OF, WITH *Stylops*, 4.  
Bee Louse, 2.  
Beetle Larva, 5.  
*Biddulphia*, sp., 55.  
*Biloculina sphaera*, 10.  
— *ringens*, 10.  
Birds of Paradise, Feather of, 246.  
Bleak, Scale of, 187.  
*Boarmia rhomboidaria*, Egg of, 253.  
*Braula cæca*, 2.  
Brown hair streak, Egg of, 252.  
*Bulimina obtusa*, 156.  
— *obliqua*, 156.  
— *variabilis*, 156.  
— *variabilis*, var., 156.  
— *brevis*, 156.  
— *Murchisoniana*, 156.  
Buff-tip Moth, Egg of, 253.  
Butterflies' Eggs, 252, 253.

CABBAGE BUTTERFLY, EGGS OF, 252.  
Cabbage-moth, Egg of the, 253.  
*Cabera pusuria*, Egg of, 254.  
Calabar Bean Starch, 68.  
Canary Thorn, Egg of the, 253.  
*Carabus nemoralis*, Nervous System of, 256.  
Carp, Scale of the Crucian, 235.  
— Prussian, 279.  
*Chalina oculata* and spicules, 172, 173.  
*Charadrius pluvialis*, 60.  
Chimney-sweeper Moth, Egg of the, 254.  
Chub, Scale of, 92.  
*Climacodium Frauenfeldianum*, 61.  
*Cænonympha Pamphilus*, Egg of, 252.  
Copper, Egg of the Small, 252.  
*Cristellaria Gaudryana*, 107.  
— *navicula*, 107.  
— *recta*, 107.  
— *rotulata*, 106.  
— —, var., 106.  
— *triangularis*, 107.  
Crowned Crane, Parasite's Egg, 132.  
Cuckoo, the, 109.  
*Cuculus canorus*, 109.  
Curlew, the, 181.  
Cuttle-fish Bone, 177, 178.  
*Cydidippe pileus*, 201.  
*Cyprinus carassius*, 235.  
— *cephalus*, Scale of, 92.  
— *Gibelio*, Scale of, 279.

DAISY FLOWER-HEAD AND FLORETS, 31, 32.  
*Dentalina aculeata*, 81.

*Dentalina communis*, 81.  
— *gracilis*, 81.  
— *Lorneiana*, 81.  
— *multicostata*, 81.  
— *nodosa*, 81.  
— *sulcata*, 81.  
Diatom from Guano, 56.  
*Drosera rotundifolia*, 111.

ECHINUS, BUCCAL APPARATUS OF, 152.  
Echinus, Climbing, 151.  
*Echinus mamillatus*, 151.  
Eel, Scales of the Snig, 280.  
Eggs of Bird Parasites, 132.  
Eggs of Butterflies and Moths, 252, 253, 254.  
*Ennomos tiliaria*, Egg of, 253.

FEATHER OF BIRD OF PARADISE, 246.  
Fieldfare, the, 13.  
Fish Scales, 92, 140, 187, 235, 279, 280.  
*Flabellina Baudouiniana*, 106.  
— *pulchra*, 106.  
— *rugosa*, 106.  
*Fronicularia unguosa*, 83.  
— *Archiaciana*, 82.  
— *elegans*, 82.  
— *ornata*, 82.  
— *radiata*, 82.  
— *tricarinata*, 83.  
— *Verneuiliana*, 82.

*Gaudryina pupoides*, 157.  
— *rugosa*, 157.  
*Globigerina bulloides*, 12.  
— *cretacea*, 108.  
— *elevata*, 108.  
Golden Plover, the, 60.  
Goldfinches and Nest, 84.  
*Gomphonitzschia Ungeriana*, 62.  
— — — — — details, 62.  
Gull, the Herring, 158.

*Halichondria panicea*, 173.  
— spicules, 174.  
— *ramosa*, 173.  
"Hasan-i-Yusaf," 176.  
Herring Gull, the, 158.  
*Hipparchia Janira*, Egg of, 252.  
Hornbill, Parasite's Egg on, 252.

*Isoëtes capsularis*, 176.  
— *velata*, 177.

*Larus argentatus*, 158.  
*Leuciscus alburnus*, Scale of, 187.  
*Lituola nautiloideu*, 107.  
Lotus, Symbolical representations of the, 125.

*Macrothrix*, 204.  
Magpie Moth, Egg of the, 253.  
Mallee Bird, Parasite's Eggs on, 132.  
*Mamestra Brassicæ*, Egg of, 253.  
*Marginulina compressa*, 82.  
— *elongata*, 82.  
— *gradata*, 82.  
— *trilobata*, 82.  
— *varicosta*, 82.

Matthew's Turn-table, 163.  
*Maurandya*, Hair of, 235.  
Meadow Brown, Egg of the, 252.  
*Meloë angusticollis*, 3.  
*Melopsittacus undulatus*, 85.  
Moths, Eggs of, 253, 254.  
*Mucor mellitophorus*, 5.  
Muscular Fibrillæ in Larva of Beetle, 68.  
*Mysis Chamæleon*, and tail of ditto, 198.

*Navicula lyra*, 56.  
— *pacifica*, 62.  
*Nepenthes distillatoria*, 128, 129.  
Nirmus, Parasite's Egg on, 132.  
*Nodosaria limbata*, 81.  
*Nonionina depressula*, 12.  
— *stelligera*, 12.  
— *turgida*, 12.  
*Numenius arquata*, 181.  
*Nymphon gracile*, 199.

*Oceania turrita*, 197.  
*Odezia chærophyllata*, Egg of, 254.

*Pallene pygmea*, 27, 28, 29.  
Parrot, the Waved, 85.  
Peacock, Parasite's Egg on, 132.  
*Pentacrinus Europæus*, 150.  
Pheasant, Parasite's Eggs on, 132.  
*Phora incrassata*, 1.  
*Pieris Brassicæ*, Egg of, 252.  
Pitcher-plant, the, 128, 129.  
*Planorbulina Ungeriana*, &c., 10.  
*Platago coronopus*, 37.  
*Pleurosigma validum*, 61.  
*Pleurostauron Frauenfeldianum*, 62.  
*Plumatellu*, and Lophophore of ditto, 228, 229, 274.  
—, Statoblast of, 274.  
—, Tunic of, filled with Statoblasts, 275.  
*Pluteus paradoxus*, Larva of, 152.  
*Podocerus capillatus*, Nests of, 198.  
*Polycera Lessonii*, 197.  
*Polyommatus Corydon*, Egg of, 253.  
*Praniza*, Larva of, 200.  
*Pulvinulina repanda*, &c., 11.  
*Pygæra bucephala*, Egg of, 253.  
*Pyrulina acuminata*, 157.

RAPHIDES IN CELL, 92.  
Red Admiral, Egg of the, 253.  
*Rosalina Clementiana*, 155.  
— *Lorneiana*, 155.  
*Rotalia Beccarii*, 11.  
— *orbicularis*, 11.  
— *crassa*, 108.  
— *Cordiciana*, 108.  
— *Micheliniana*, 107.  
— *umbilicata*, 107.  
— *Voltziana*, 107.

*Sagitta bipunctata*, and head of ditto, 20.  
*Sagrina rugosa*, 157.  
Sandfly and its Parasite, 99.  
*Sarsia tubulosa*, 196.  
Scales of Fish, 92, 140, 187, 235, 279, 280.  
Scale of *Tillandsia*, 116.  
Sepiostaire, 177, 178.



Sphæraphides in Cell, 92.  
 Sponges, Common British, 172, 173, 174.  
 Starch of Calabar Bean, 68.  
*Stenosoma lineare*, 198.  
*Stictodiscus Californicus*, 61.  
*Stylops Childreni*, 4.  
 Sundew, Hairs of, 111.  
*Sygnanthus Acus*, 202  
 — *anguineus*, 202.  
 — *æquoreus*, 202.  
 — *Typhle*, 202.

TENCH, SCALE OF, 140.  
*Textularia Baudouiniana*, 157.

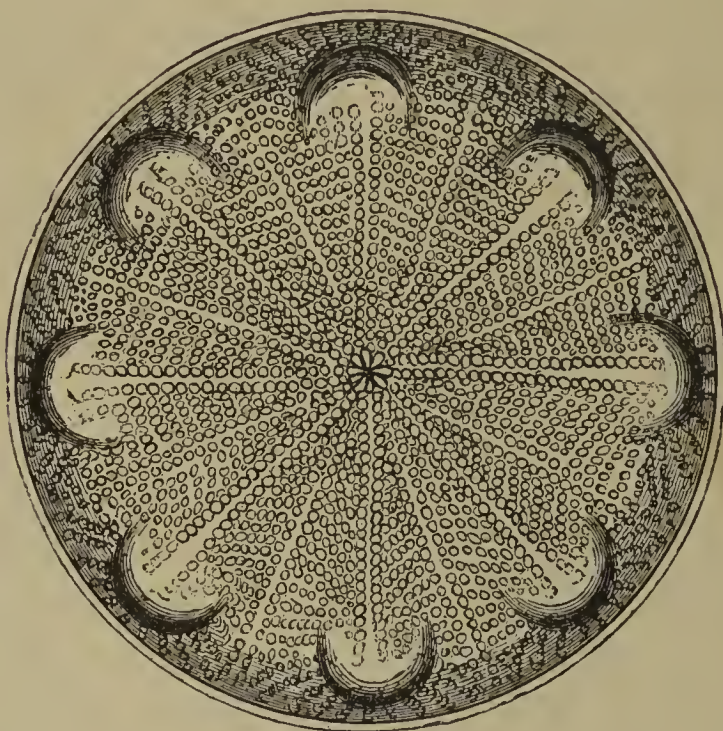
*Textularia trochus*, 157.  
 — *turris*, 157.  
*Thaumantias cymbaloïdea*, 196.  
 — *pilosella*, 195.  
*Thecla Betulæ*, Egg of, 252.  
*Tillandsia*, Scale of, 116.  
 Towing Net, the Home Made, 194.  
 Tragopan, Eggs of Parasite of, 132.  
*Trichodes apiarius*, 2, 3.  
*Triloculina tricarinata*, 10.  
 — *trigonula*, 10.  
*Truncatulina Beaumontiana*, 155.  
*Turdus pilaris*, 13.  
 Turn-table, Dr. J. Matthews', 163.

*Turris digitalis*, 196.

*Uvigerina tricarinata*, 157.

*Vaginicola* —, 33, 34.  
*Valvulina gibbosa*, 156.  
*Vanessa Atalanta*, Egg of, 252.  
*Verneuilina tricarinata*, 156.  
*Viburnum Lantana*, Hairs and Sphæraphides of, 187.

White Wave, Egg of the, 354.  
 Willow Beauty, Egg of, 252.





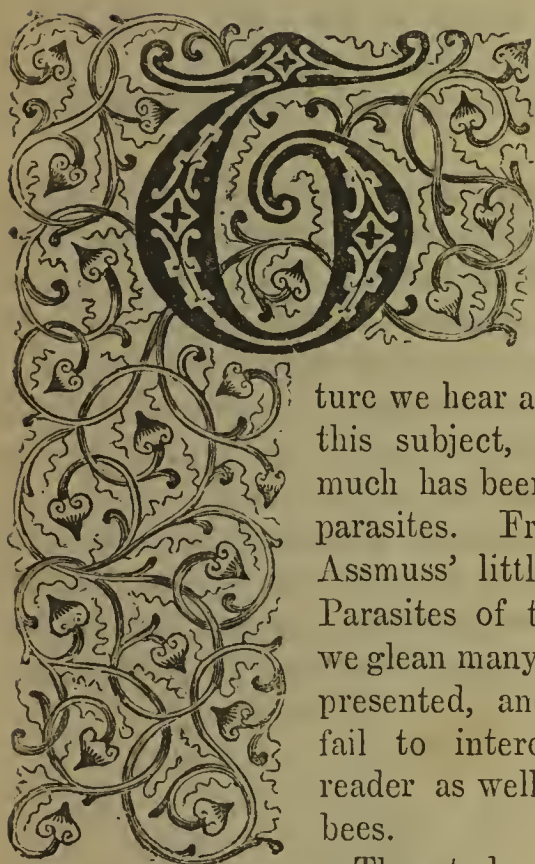


January, 1870.

Hardwicke's Science-Gossip.

## THE PARASITES OF THE HONEY-BEE.

By A. S. PACKARD, JUN., M.D.



THE generality of bee-keepers are unaware how many insect parasites infest the Honey-bee. In our own litera-

ture we hear almost nothing of this subject, but in Europe much has been written on bee parasites. From Dr. Edward Assmuss' little work on "the Parasites of the Honey-bee," we glean many of the facts now presented, and which cannot fail to interest the general reader as well as the owner of bees.

The study of the habits of animal parasites has of late gained much attention among naturalists, and both the honey and wild bees afford good examples of the singular relation between the host and the parasites which live upon it.

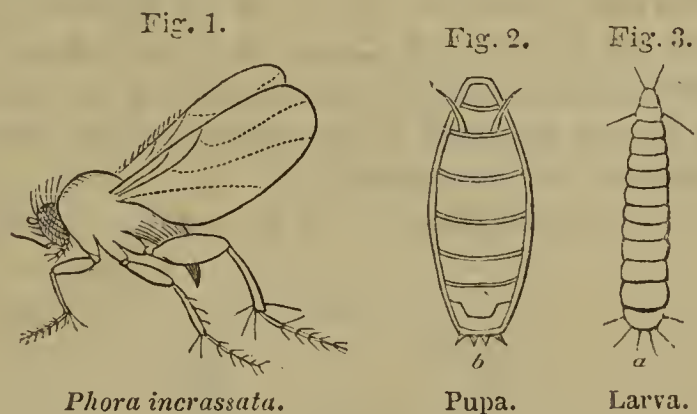
Among insects generally, there are certain species which devour the contents of the egg of the victim. Others, and this is the most common mode of parasitism, attack the insect in its larva state; others in the pupa state, and still others in the perfect, or imago state. Dr. Leidy has shown that of the wood-devouring species, a beetle, *Passalus cornutus*, and some *Myriapods*, or "thousand legs," are, in some cases, tenanted by myriads of microscopic plants and worms, which luxuriate in the alimentary canals; while the "caterpillar fungus" attacks sickly caterpillars, filling out their bodies, and sending out shoots into the air, so that the insect looks as if transformed into a vegetable.

The Ichneumon flies, of which there are undoubtedly several thousand species in this country,

are the most common insect parasites. Next to these are the different species of *Tachina* and its allied genera. These, like Ichneumons, live in the bodies of their hosts, consuming the fatty parts, and finishing their transformations just as the exhausted host is ready to die, issue from their bodies as flies closely resembling the common house-fly.

An insect, allied to the *Tachina*, has been found in Europe to be the most formidable foe of the hive-bee, sometimes producing the well-known disease called "foul-brood," which is analogous to the typhus fever of man.

This fly, belonging to the genus *Phora* (fig. 1, *Phora incrassata*; fig. 2, puparium; fig. 3, larva), is



a small insect about one line and a half long, and found in Europe during the summer and autumn flying slowly about flowers and windows, and in the vicinity of bee-hives. Its white, transparent larva is cylindrical, a little pointed before, but broader behind. The head is small and rounded, with short three-jointed antennæ, and at the posterior end of the body are several slender spines. The puparium, or pupa-case, inclosing the delicate chrysalis, is oval, consisting of eight segments, flattened above, and with two large spines near the head, and four on the extremity of the body.

When impelled by instinct to provide for the continuance of its species, the *Phora* enters the bee-hive and gains admission to a cell, where it bores with its ovipositor through the skin of the bee-larva,



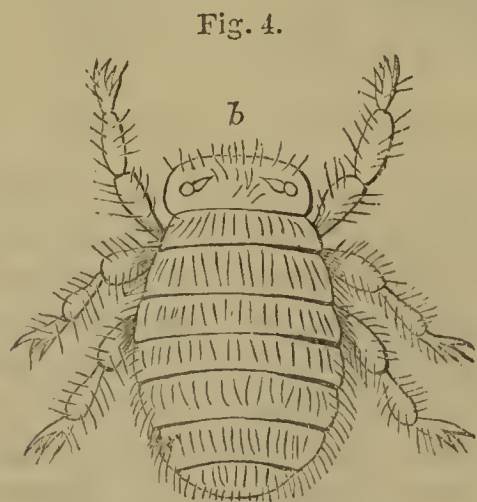
laying its long oval egg in a horizontal position just under the skin. The embryo of the Phora is already well developed, so that in three hours after the egg is inserted in the body of its unsuspecting and helpless host, the embryo is nearly ready to hatch. In about two hours more it actually breaks off the larger end of the egg-shell, and at once begins to eat the fatty tissues of its victim, its posterior half still remaining in the shell. In an hour more it leaves the egg entirely and buries itself completely in the fatty portion of the young bee.

The maggot moults three times. In twelve hours after the last moult it turns around with its head towards the posterior end of the body of its host, and in another twelve hours, having become full-fed, it bores through the skin of the young bee, eats its way through the brood-covering of the cell, and falls to the bottom of the hive, where it changes to a pupa in the dust and dirt, or else it creeps out of the door and transforms in the earth. Twelve days after, the fly appears.

The young bee, emaciated and enfeebled by the attacks of its ravenous parasite, dies, and its decaying body fills the bottom of the cell with a slimy foul-smelling mass, called "foul-brood." This gives rise to a miasma which poisons the neighbouring brood, until the contagion (for the disease is analogous to typhus, jail, or ship fever) spreads through the whole hive, unless promptly checked by removing the cause and thoroughly cleansing the hive.

Foul-brood sometimes attacks our American hives, and, though the cause may not be known, yet from the hints given above we hope to have the history of our species of Phora cleared up, should our disease be found to be sometimes due to the attacks of such a parasite fly.

We figure the Bee-louse of Europe (fig. 4, *Braula*



Bee-louse (*Braula cæca*).

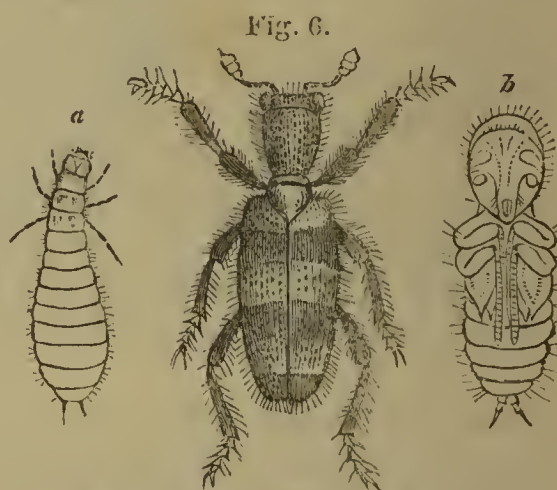
*cæca*, Nitsch), which is a singular wingless spider-like fly, allied to the wingless Sheep-tick (*Melophagus*), the wingless Bat-tick (*Nycteribia*), and the winged Horse-fly (*Hippobosca*). The body is divided into two regions, like the spider. The head is very large, without eyes or ocelli (simple

eyes), and the ovate hind-body consists of five segments, and is covered with stiff hairs. It is one-half to two-thirds of a line long. This spider-fly is "pupiparous," that is, the young, of which only a very few are produced, are not born until it has, or is just about to, assume the pupa state. The larva (fig. 5) is oval, eleven-jointed, and white in colour. The very day it is hatched it sheds its skin and changes to an oval puparium of a dark-brown colour.

Its habits resemble that of the flea. Indeed, should we compress its body strongly, it would bear a striking resemblance to that insect. It is evidently a connecting link between the flea and the two-winged flies. Like the former it lives and brings forth its young on the body of its host, and draws its food from its host by plunging its stout beak into the skin of the bee.

It has not been noticed in this country, but is liable to be imported on the bodies of Italian bees. Generally, one or two of the Braulas may, on close examination, be detected on the body of the bee; sometimes the poor bees are loaded down by as many as a hundred of these hungry bloodsuckers. Assmuss recommends rubbing them off with a feather, as the bee goes in and out of the door of its hive.

Among the beetles are a few forms occasionally found in bees' nests and also parasitic on the body of the bee. *Trichodes apiarius*, Linn. (fig. 6, fig. 6 a, larva; fig. 6 b, pupa, front view), has long been

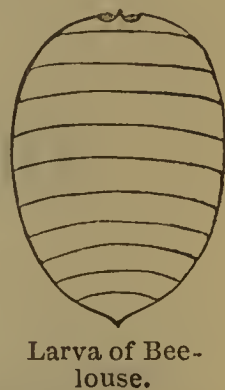


*Trichodes apiarius*. a. larva. b. pupa.

known in Europe to attack the young bees. In its perfect, or beetle, state it is found on flowers, like our *Trichodes Nuttallii*, which is commonly found on the Spiræa in August, and which may yet prove to enter our bee-hives. The larva devours the brood, but with the modern hive its ravages may be readily detected.

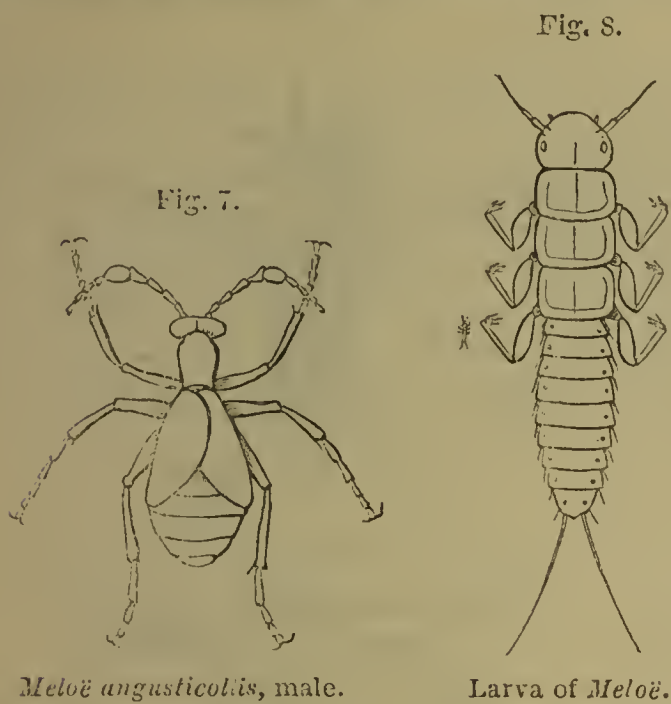
The Oil-beetle, *Meloë angusticollis*, Say (fig. 7, male, differing from the female by having the antennæ as if twisted into a knot; fig. 8, the active larva found on the body of the bee), is a large dark-blue insect found crawling in the grass in the

Fig. 5.





vicinity of the nests of *Andrena* and *Halictus* and other wild bees in May, and again in August and September. The eggs are laid in a mass covered



*Meloë angusticollis*, male.

Larva of *Meloë*.

with earth at the root of some plant. During April and early in May, when the willows are in blossom, we have found the young recently hatched larva in considerable abundance creeping briskly over the bees, or with their heads plunged between the segments of the body, greedily sucking in the juices of their host. Those that we saw occurred on the humble-bee, *Halictus* and *Andrena*, and various flies (*Syrphus* and *Muscidæ*), and there is no reason why they should not infest the honey-bee which frequents similar flowers, as they actually are known to do in Europe. These larvæ are probably hatched out near where the bees hibernate, so as to creep into their bodies before they fly in the spring, as it would be impossible for them to crawl up a willow-tree ten feet high or more, their feet being solely adapted for climbing over the hairy body of the bee, which they do not leave until about to undergo their strange and unusual transformations.

In Europe, Assmuss states that on being brought into the nest by the bee, they leave the bee and devour the eggs in the bee-cells, and then attack the bee-bread. When full-fed and ready to pass through their transformations to attain the bee state, instead of at once assuming the pupa and imago state, as in the *Trichodes* represented above, they pass through a *hyper-metamorphosis*, as Fabre, a French naturalist, calls it. In other words, the changes in form which are preparatory to assuming the pupa and imago states are here more marked and almost coequal with the larva and pupa states, so that the *Meloë*, instead of passing through three states (the egg, larva, and pupa), in reality passes through these and two others in addition, which are intermediate. The whole subject of the metamorphosis of this beetle needs revision, but Fabre states that the larva, soon after entering the nest of its host, changes its skin and assumes a second larva

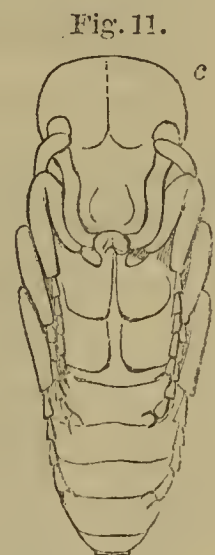
form (fig. 9), which somewhat resembles the larva of the Goldsmith beetle. Newport, who with Siebold has carefully described the metamorphoses of *Meloë*, does not mention this stage in its development, which he calls "pseudo-chrysalis." It is motionless; the head is mask-like, without movable appendages, and the feet are represented by six tubercles. This is more properly speaking the semi-pupa, and the mature pupa grows beneath its mask-like form, which is finally moulted. This form, however, according to Fabre, changes its skin and turns into a third larva-form (fig. 10, from Newport). After some time it assumes its true pupa form (fig. 11, from Newport), and finally moults this skin to appear as a beetle (fig. 7).



Second larva form of *Trichodes*.



Third larva form of *Trichodes*.



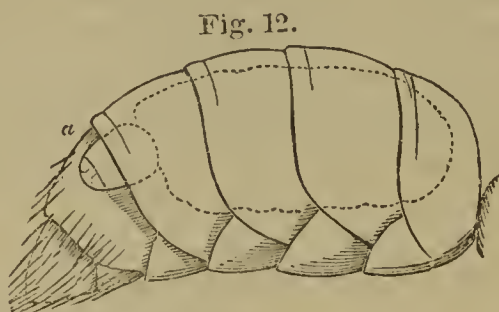
Pupa of *Trichodes*.

Fabre has also, in a lively and well-written account, given a history of *Sitaris*, a European beetle, somewhat resembling *Meloë*. He states that *Sitaris* lays its eggs near the entrance of bees' nests, and at the very moment that the bee lays her egg in the honey-cell the flattened ovate *Sitaris*-larva drops from the body of the bee upon which it has been living, and feeds upon the contents of the freshly-laid egg. After eating this delicate morsel it devours the honey in the cell of the bee, and changes into a white cylindrical, nearly footless grub; and after it is full-fed, and has assumed a supposed "pupa" state, the skin, without bursting, incloses a kind of hard "pupa" skin, which is very similar in outline to the former larva, within whose skin is found a whitish larva, which directly changes into the true pupa. In a succeeding state this pupa in the ordinary way changes to a beetle which belongs to the same group of Coleoptera as *Meloë*. We cannot but think, from observations made on the humble-bee, the wasp, two species of moths, and several other insects, that this "hyper-metamorphosis" is the normal mode of insect metamorphosis, and that the changes of these insects, made beneath the skin of the mature larva before assuming the pupa state, are almost as remarkable, though



less easily observed, as those of Meloë and Sitaris. Several other beetles allied to Meloë are known to be parasitic on wild bees, though the accounts of them are fragmentary.

The history of *Stylops*, a beetle allied to Meloë, is no less strange than that of Meloë, and is in some respects still more interesting. On June 18th I captured an *Andrena vicini* which had been "stylopized." On looking at my capture I saw a pale reddish-brown triangular mark on the bee's abdomen; this was the flattened head and thorax of a female *Stylops* (fig. 12, position of the female of



Abdomen of Bee, with *Stylops* at a.

*Stylops*, seen in profile in the abdomen of the bee; fig. 13, the female seen from above. The head and thorax is soldered into a single flattened mass,—the baggy hind body being greatly enlarged like that of the gravid female of the white ant (*Termes*), and consisting of nine segments.



Fig. 13.

*Stylops* seen from above.

On carefully drawing out the whole body, which is very extensible, soft, and baggy, and examining it under a high power of the microscope, we saw multitudes—at least several hundreds—of very minute larvæ, like particles of dust to the naked eye, issuing in every direction from the body of the parent now torn open in places, though most of them made their exit through an opening on the under side of the head-thorax. The *Stylops*, being hatched out while still in the body of the parent, is therefore viviparous. She probably never lays eggs.

On the last of April, when the Mezereon was in blossom, I caught the singular-looking male, *Stylops Childreni*, Gray (fig. 14; a, side view; it is about one-fourth of an inch long), which was as unlike its partner as possible. I laid it under a tumbler, when the delicate insect flew and tumbled about till it died of exhaustion in a few hours.

It appears, then, that the larvæ are hatched during the middle or last of June from eggs fertilized in April. The larvæ then crawl out on to the body of the bee, on which they are transported to the nest, where they enter, according to Peck's observations, the body of the larva, on whose fatty parts they feed. Previous to changing to a pupa, the larva lives with its head turned towards that of

its host, but before assuming the perfect state (which they do in the late summer or autumn) they must reverse their position. The female protrudes

Fig. 14.

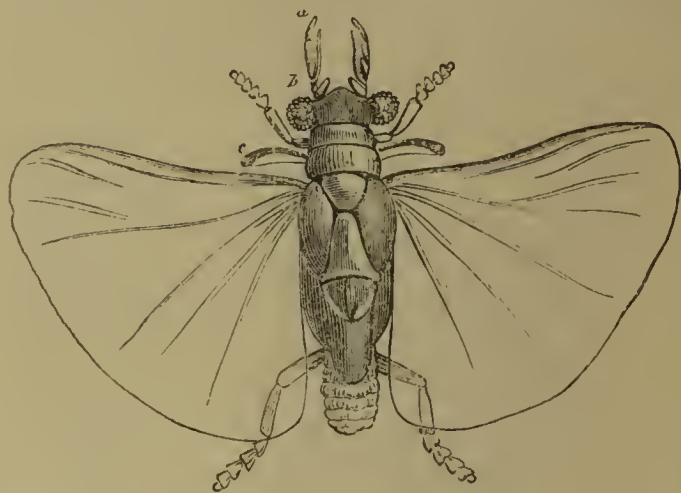


Fig. 14 a.



*Stylops Childreni*. a. side view.

the front part of its body between the segments of the abdomen of her host, as represented in our figure. This change, Newport thinks, takes place after the bee-host has undergone its metamorphoses, though the bee does not leave her earthen cells until the following spring. While the male *Stylops* deserts its host, his wingless partner is imprisoned during her whole life within her host, and dies immediately after giving birth to her myriad (for Newport thinks she produces over two thousand young) offspring.

*Xenos Peckii*, an allied insect, was discovered by Dr. Peck to be parasitic in the body of wasps, and there are now known to be several species of this small but curious family, *Stylopidae*, which are known to live parasitically on the bodies of our wild bees and wasps. The presence of these parasites, which live on the fatty parts, finally exhausts the host, so that the sterile female bee dies prematurely.

As in the higher animals, bees are afflicted with parasitic worms which induce disease and sometimes death. The well-known hair-worm (*Gordius*) is an insect-parasite. The adult form is about the size of a thick horse-hair, and is seen in moist soil and in pools. It lays, according to Dr. Leidy, "millions of eggs connected together in long cords." The microscopic, tadpole-shaped young penetrate into the bodies of insects frequenting damp localities. Fairly ensconced within the body of their unsuspecting host, they luxuriate on its fatty tissues, and pass through their metamorphoses into the adult form, when they desert their living house and take to the water to lay their eggs.

In Europe, Siebold has described *Gordius subfurcus* which infests the drones of the honey-bee, and also other insects. Professor Siebold has also



described *Mermis albicans*, which is a similar kind of hair-worm, from two to five inches long, and whitish in colour. This worm is also found, strangely enough, only in the drones, though it is the workers which frequent watery places to appease their thirst.

Thousands of insects are carried off yearly by parasitic fungi. The ravages of the Muscardine, caused by a minute fungus (*Botrytis Bassiana*, Balsamo), has threatened the extinction of silk culture in Europe. Dr. Leidy mentions a fungus which must annually carry off myriads of the seventeen-year locust. A somewhat similar fungus, *Mucor mellitophorus* (fig. 15), infests bees, filling the sto-

Fig. 15.

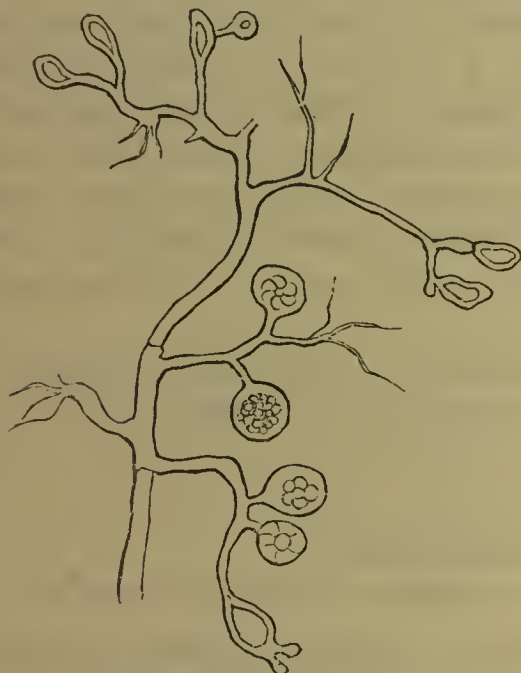
*Mucor mellitophorus*.

Fig. 16.



Beetle larva.

mach with microscopic colourless spores, so as to greatly weaken the insect.

As there is a probability that many insects, parasitic on the wild bees, may sooner or later afflict the honey-bee, and also to farther illustrate the complex nature of insect parasitism, we will for a moment look at some other bee-parasites.

Among the numerous insects preying in some way upon the humble-bee are to be found other species of bees and moths, flies and beetles. Insect parasites often imitate their host: *Apathus* can scarcely be distinguished from its host, and yet it lives cuckoo-like in the cells of the humble-bee, though we know not yet how injurious it really is. Then there is the *Conops* and *Volucella*, the former of which lives like *Tachina* and *Phora* within the bee's body, while the latter devours the brood. The young of another fly allied to *Anthomyia*, of which the onion-fly is an example, is also not unfrequently met with. A small beetle (*Antherophagus ochraceus*) is a common inmate of humble-bees' nests, and probably feeds upon the wax and pollen. We have also found several larvæ (fig. 16) of a beetle of which we do not know the adult form. Of similar habits is probably a small moth (*Nephopteryx Edmundsii*)

which undoubtedly feeds upon the waxen walls of the bee-cells, and thus, like the attacks of the common bee-moth (*Galleria cereana*), whose habits are so well known as not to detain us, must prove very prejudicial to the wellbeing of the colony. This moth is in turn infested by an Ichneumon-fly (*Microgaster Nephopteris*), which must destroy many of them.

A minute Ichneumon (*Anthophorabia Megachilis*) which is parasitic on Megachile, the leaf-cutter bee, illustrates the transformations of the Ichneumon-flies, the smallest species of which yet known (and we believe the smallest insect known at all) is the *Pteratomus Putnami*, or "winged-atom," which is only one-ninetieth of an inch in length, and is parasitic on *Anthophorabia*, itself a parasite. A species of mite is always to be found in humble-bees' nests, but it is not thought to be specially obnoxious to the bees themselves, though several species of mites (*Gamasus*, &c.) are known to be parasitic on insects.

For a proper study of our bees and wasps, we should collect their nests from the end of May until late in the Autumn. We should watch for the different broods and collect the larva, pupa, and adult of both sexes, as well as the workers. The cells containing the young, with whatever parasites may be found on them, may be placed in alcohol, while the mature bees may be pinned. The simplest method of collecting the nests of humble-bees is to visit them before sunrise or after sunset, when the bees are in the nest, and we can secure the whole colony. The bees can be picked up with forceps as they emerge from the nest, or caught with the net and then pinned. Refractory colonies may be easily quelled by pouring in ether or chloroform, or burning sulphur at the aperture, as is the best method of procedure with wasps' nests.

The solitary species, besides boring in the earth like *Andrena* and *Halictus*, also bore in the stems of different plants, such as the elder, syringa, raspberry, and blackberry. Nearly fifty species of insects, mostly Hymenoptera, are known in France to burrow in the stems of the blackberry alone! Now is the time to look for their burrows in the dead branches. Their presence is usually detected by an old hole at the end of a broken branch. The writer would be greatly obliged for material to aid him in the study of our bees and wasps, and would take pleasure in corresponding with those interested in the study of their habits, and would be very grateful for specimens of the young in alcohol, their parasites and nests.—*The American Naturalist*, for June, 1868.

---

WE never can surprise Nature in a corner; never find the end of a thread; never tell where to set the first stone.—*Emerson's Essays*.



## FLORAL FINDINGS.

" 'Tis Summer, 'tis Summer, the wild birds are singing,  
The woods and the glens with their sweet notes are ringing,  
The skies are all glowing with crimson and gold,  
And the trees their bright blossoms begin to unfold."

"Who has not dreamed a world of bliss,  
On a bright sunny day like this?"

SITTING under the shade of a large Elm-tree, listening to the clear music of the skylark, arranging a basket full of flowers which I had gathered in the course of my walk yesterday morning, it occurred to me that I would jot down a short account of my floral findings for the perusal of those lovers of country life who are obliged to remain in town at this enjoyable season.

"Praise the bridge that carries you over" is a very old and homely saying: let me take a hint from it, and give the place of honour to the *Ulmus campestris*, whose protecting branches shielded me from the sun.

This tree is in full beauty now; foliage and fruit are perfection; one scarcely wonders that the Saxons worshipped it. The first woman, according to Teutonic mythology, was made out of the Elm. What "wooden dolls" those ancient barbarians must have thought us; for it is more than probable that they were equally ignorant of the virtues it possessed, though they evidently perceived its loveliness. Our poets, however, assign to it rank amongst the lords of the creation. Milton and Shakespeare, for instance, wed it to the vine, and I think the Mountain Bard has a like passage in his works.

A whole page might be filled with its uses; they are numerous. Its bark is highly astringent, and affords a substance called by chemists *ulmin*; it is also valuable to dyers, produces a pretty yellowish-brown colour; and silkworms eat its leaves,—so do many other creatures, for most animals are fond of its foliage; and as to insects, the Elm-tree is a fine hunting-ground for the collector. You have seen the leaves curl up occasionally? Well, the *Aphis ulmi* rolls them into that form, to make a shelter for himself. He is partial to the juice, but, being rather fragile, requires protection from the weather. Some animals are supposed to eat their old cast-off clothes, but here is an insect that drinks his home.

Let me see, what did I find first? Oh! those yellow flags by the water side—"Seggs," as a friend of mine from the north calls them. The yellow flag belongs to the Iris family,—a large family it is too; there are over a hundred species of Iris, I believe! and some of them are very lovely. One can easily credit old Plutarch's version that the generic name was bestowed on them by the Egyptians on account of their various hues. It resembles a word in their tongue signifying "Eye of Heaven." This especial flag is perhaps one of the least attractive, yet in its

natural element, water, it looks exceedingly charming. Yesterday, its large showy flowers and deep green leaves were seen to advantage there, but in vase or stand it seems out of place.

Leaving the stream and going out into the field, I found some Foxgloves growing luxuriantly by the hedgeside—*Gants de Notre Dame* is a far more appropriate name. When did Reynard ever wear gloves, and such gloves as these? But a fanciful imagination might enslave the Virgin's fingers in its elegant pendulous flowers. I like the word stately as applied to this plant: it has a regal look, and I often wonder why our old English poets never noticed it. Its poisonous properties most certainly could not have shut it out from mention, for Shakespeare alludes to several of our most deadly herbs and flowers. Painters have been more alive to its charms; it has been introduced into many landscapes. We are indebted to the Foxglove for one of the most valuable medicines, *Digitalis*, and the Italian proverb "Aralda chi tutte piaghe salda;" or, "Foxglove cures all wounds," shows that its vulnerary powers were fully recognized in Italy.

Close to the foxglove's purple flowers grew two of our most beautiful British ferns, Hart's-tongue and *Athyrium Filix femina*.

"If you would see the lady fern,  
In all her graceful power,  
Go look for her where the woodlarks learn," &c.

sings, or rather sang, "Calder Campbell." And there, in just such a spot as he so well describes, stood her ladyship surrounded by her friends; her pale green fronds towering proudly above them all, while the *Scolopendrium* evidently liked its quarters quite as well as if it had been in the society of the Brakens.

The Water Crowfoot (*Ranunculus aquatilis*), with its white petals, its relative, the "butter-flower," as the Meadow Crowfoot is often termed, close by. Really, as cows make a rule of declining this plant, I cannot see why country folks should insist on asserting that the rich yellow colour of the butter in spring and summer is produced by it. Popular errors are difficult to correct: there is not an old dairywoman in the parish who would not deem me insane if I told her that the *Butter-flower*, on which she so depends for golden-coloured produce, blisters the mouth of any one who is silly enough to taste it. The "Cuckoo-buds of yellow hue" in Shakespeare's immortal verse, are thought to have been this blossom, not the *Cardamine pratensis*, now known as "Cuckoo-flower." The French *Bouton d'or* is a double variety of our Crowfoot. It is often grown in gardens; so, indeed are many handsome members of the genus *Ranunculus*, but they are all more or less suspicious characters, and I should not like to partake of a salad into which either



leaves, or bulbs, or roots had been introduced, though some German writers say the peasantry boil the herb now under notice, and eat it with impunity. Perhaps boiling destroys its poisonous properties: heat does in many instances dissipate the acridity of plants.

And here is a branch of the Elder. What a very grand botanical name it has, *Sambucus*, derived from, so the sages say, *Sambuca*, a musical instrument which was always made of its wood. Were the *Sambuca* and the Sackbut identical? Many botanical works say that the berries are injurious to fowls; all I know is, that my hens and chickens delight in the ripe fruit, and none of them seem one penny the worse (there is a fine Elder-tree in the poultry-yard); they perch on the branches, and offer a living actual denial to the assertion that "although small birds eat the elder-berries, fowls are poisoned by them."

Few plants or trees excel this in economical uses, as books have it; but I am not going to enumerate them here. Elder-flower water makes a very nice wash for the face, and I dare say Madame Rachel is well acquainted with its virtues in this particular way.

The Elder is found in Arabia and Syria at the present day; the *Ukti Khaman* is known and valued there, so I think it exceedingly probable that some highly-lauded skin lotion with an unpronounceable Arabic name may only be a simple extract of flowers of Elder after all. My "findings" are arranged, and as I sit thinking of Mary Howitt's lines,—

"How pleasant the life of a bird must be,  
Flitting about in each leafy tree,  
In the leafy trees so broad and full,  
Like a green and beautiful palace hall!"

and wondering whether flowers do suffer pain when rudely torn from their kindred friends to fade and die between leaves of blotting-paper,—the sound of a gun startles me, and a beautiful woodpigeon falls wounded in the lane (some little tyrant of a village boy, having borrowed without leave his father's gun, is out killing small birds), while my own son, who had been, I fondly thought, safe with his copybook at home, runs up shouting, "Here is a beautiful nest, mamma, and four lovely blackbirds in it; the old mother bird did make such a noise when I took them!"

HELEN E. WATNEY.

*The Lodge, Hambledon.*

#### A NEW ERA IN MICROSCOPY.

THE progress of microscopical inquiry during the past twelve months, especially as it displays itself in the labours of the Royal Microscopical Society of London,\* suggests many serious reflections as to the future of Histology. Unquestionably, the facts and observations which have recently been brought forward lead us to be ex-

tremely sceptical as to the reliability of the conclusions of what are called practical microscopists. So many of our old landmarks have been swept away that we feel as though we were commencing the study of Histology *de novo*; for if, as it seems not unlikely to prove, our dry object-glasses are subject to grave aberrations, and our methods of illumination are calculated to give rise to delusive impressions, on what fixed conditions shall we base our researches? If our object-glasses of high amplifying power give distorted and unnatural optical images, and if, in addition, our methods of illumination—or, at least, those in use prior to 1869—are calculated to deceive us as to structure and arrangement, what dependence can we place on researches made under such objectionable circumstances? Yet we can gather nothing else from the able and lucid papers which, during the past session, have been read before the Microscopical Society. The Rev. J. B. Reade has demonstrated beyond question that the old notion of the diatom valve marked with linear striæ is absolutely erroneous, and due to defective illumination; for by the employment of a natural method of lighting up the structure he has shown us that these striæ are merely the lines of shadow thrown by a multitude of little hemispherical elevations which stud the surface of the valve. Here, then, is the demolition of one of the most elementary dicta of microscopists. What shall we say of the men who passed their lives in counting and fighting over those shadows which are now proved to be a false expression of structure! But this is not all. At the very last meeting of the Microscopical Society a paper was read by Dr. Royston Pigott, in which another of the elementary axioms of the microscopist was assailed, and we may almost say annihilated. Dr. Pigott has been studying that favourite of the microscopists the Podura scale, and he has arrived at the conclusion that its structure as hitherto represented is another of the illusions of imperfect optical apparatus. He alleges that the wedge-shaped markings are a mockery and a snare, and that the real constitution of the scale is that of a number of bead-like corpuscles placed end to end, there being separate rows for each side of the scale, and these rows crossing each other obliquely. Here, then, if Dr. Pigott's elaborate mathematical arguments be correct, is another of our landmarks swept away.

To the outsider it will seem perhaps that microscopy is no longer worthy of respect or reliance. We should be very sorry indeed to countenance so incorrect an idea. That there are errors is undoubted; but that those who make them should themselves point them out is one of the happiest of omens for the future of Science; for it tells us that those men who are working with the microscope have for their highest aim the discovery of that which is right and true. The discovery of error is

\* See the *Monthly Microscopical Journal*, Nos. 1 to 11, 1869.



often more valuable, when properly applied, than the discovery of truth. The whole aspect of the present phase of microscopical progress, however, suggests the importance of revising our labours, especially in general microscopical anatomy, of taking stock, so to speak, of our facts. And here the very important query presents itself: In how far are we justified in reasoning to living structures from the examination of tissues *post mortem*? It is only a few months since Mr. W. S. Savory showed that the blood corpuscle of the frog in its living state contains no trace whatever of a nucleus. Yet if any one twelve months ago had ventured to dissent from the general doctrine that all cold-blooded vertebrates have nucleated blood disks, he would at once have been pronounced either rash or ignorant. Yet, here again is a microscopical landmark—one of inference it is true—overturned. The microscopist, seeing a nucleus in the dead corpuscle, inferred its existence in the living one, and, as we see, made a serious mistake. May it not, we ask, prove equally true that our nuclei in cartilage, our fibrillæ and striæ in muscle, and our connective-tissue-corpuscle in tendon are equally post-mortem fallacies? Do we not, then, commence a new era? and is it not necessary, with the aid of immersion objectives, Reade's prisms, and living tissues, to travel once more over the histological field, and try to discover the extent of the darkness in which our microscopists have for centuries been groping?—*Scientific Opinion*.

#### PLANTS ATTRACTIVE TO INSECTS.

**I**N this paper it is my intention briefly to notice a portion of the flowers and shrubs which prove an attraction to insects, more especially to our Lepidoptera, thinking it may be a good hint to those who read this valuable periodical, and who possess a garden, which, by the bye, is a great desideratum to an entomologist; and it would be advantageous to set apart a portion of the same for the cultivation of such plants, &c., as would prove an attraction to, and bring within his reach, some of the objects of his favourite study. By cultivating such plants, a great many insects may be brought from surrounding parts, which might, perhaps, not otherwise be obtained. The plants, shrubs, &c., which I shall allude to in this paper, may with little trouble be cultivated, and would answer the twofold purpose of a kind of trap or decoy for insects, besides being ornaments to the garden.

The first, and one of the plants which prove most attractive to Lepidoptera, is the Red Valerian (*Valeriana rubra*); many of the nocturnal Lepidoptera—

“Soft moths that kiss

The sweet lips of the flowers and harm not”—

may at dusk be seen quietly hovering over the flowers of this plant and rifling them of their

sweets; amongst the “silent revellers” the Small Elephant Hawk-moth (*Chærocampa porcellus*), may sometimes be seen hovering round the flowers, and now and then stopping to sip the sweet nectar which they afford. The Red Valerian is also a favourite flower with the Golden Y (*Plusia iota*), the Burnished Brass (*P. chrysitis*), and the Silver Y (*P. gamma*), the latter of which may sometimes be seen in great numbers hovering over the flowers, and darting away at the least sound, again to revisit them when silence “reigns supreme.” The Currant Clearwing (*Sesia tipuliformis*), the Bright-line Brown-eye (*Hadena oleracea*), and the Small Ranunculus (*Hecatera dysodea*), have also been taken from this flower as well as many others.

The Jessamine and Larkspur are amongst the flowers most loved by the Humming-bird Hawk-moth (*Macroglossa stellatarum*), from the latter of which I have myself taken several specimens this season. This elegant moth feeds by day as well as in the evening, and may be observed pursuing its bird-like flight in the hottest sunshine; scarcely ever alighting, it thrusts its long spiral trunk into the flowers to sip the sweet nectar, and darts off at the least sound, again to return to, perhaps, the very identical flower soon afterwards. The flight of a Sphinx, described by Mr. Douglas in the following elegant language, is a true representation of the flight of this moth, and is exactly *à propos*. He says:—

“Did you ever see a Sphinx fly? There is nothing to compare its motion to except a flash of lightning. While you are looking at a flower in the twilight, between you and it glides a motion, a moving haziness, which is before you and yet conveys to your eye no definite image. Before you have half thought what it can be, you see the flower again distinctly, and rub your eyes, thinking there must have been an illusion, or possibly an unsteadiness of vision caused by the irritation of that gnat that was buzzing about your head; when, lo! the flower just beyond seems to shiver,—you move to see what is there, but there is a move before you, and a dim shadow flits away like a thought. Can it be anything real? Stand awhile: and now, in the increasing gloom, as you bend over the Petunias, holding your breath, you see a darkness visible drop down before you, but its presence is better made known by the humming sound caused by the rapid vibration of wings. Stir not, or this aerial body will float away. Now you see it deigns not to alight or touch the margin of the chalice, but poising itself in air, stretches out its long tubular tongue and quaffs the nectar at the bottom.”

The Bladder Campion (*Silene inflata*) is, among wild flowers, one of the chief, and possesses great power of attraction to many of the *Noctuæ*. Amongst those that have been taken from this common wild flower, I may mention the Turnip-



moth (*Agrotis segetum*), the Double-spotted Square-spot (*Noctua triangulum*), the Flame (*Axylia putris*), and the Netted Pug (*Eupithecia venosata*), the larvæ of which feed inside the seed-capsules of this plant; also the Sandy Carpet (*Emmelesia decolorata*), Seorehed Carpet (*Ligdia adustata*), Lychnis (*Dianthæcia capsicola*), Burnished Brass (*P. chrysis*), and the Silver Y moth (*P. gamma*), the latter of which I have seen, not by dozens, but even by scores, flying over the flowers of this plant.

The Honeysuckle, or Woodbine (*Lonicera Periclymenum*), that sweet shrub which is the ornament of many a cottage door, and perfumes the very air with its sweetness, is, too, a favourite with many of our moths,—

“ By rustic seat and garden bower  
There's not a leaf, or shrub, or flower,  
Blossom, or bush, so sweet as thee,  
Lowly, but fragrant Honey-tree.  
By stately halls we see thee not,  
But find thee near the lowly cot,  
Or latticed porch; by humble door  
Thou leanest, with thy honeyed store,  
Dropping, from thy bee-bosomed flowers,  
Sweetness through evening's dewy hours.  
Tree of the cottage and the poor!  
Can palace of the rich have more?  
No! Sweet content as seldom dwells,  
In palaces as lowly cells.”

This plant is also one of the chief which afford a delicate repast for the Humming-bird Sphinx (*M. stellatarum*), and its near relation the very rare Silver-striped Hawk-moth (*Chærocampa celerio*), also the Gold Spangle (*Plusia bractea*), and many other species of moths.

A great quantity of moths are also to be taken from the blossoms of the Reed (*Arundo phragmites*); amongst those found flying around this plant are the Red and Yellow-line Quaker (*Orthosia lota* and *O. macilenta*) and the Angle Shades (*Phlogophora meticulosa*); also, but very rarely, the Reed-moth (*Macrogaster Arundinis*), which deposits its eggs on the stem of this plant.

Amongst wall-plants the Ivy, when in bloom, is one of the most productive; and the sweet odour given out by its flowers when in full bloom, is a great attraction to many of the day as well as the night-flying Lepidoptera, as well as a multitude of bees, which swarm around it collecting honey from the blossoms. By day many of the individuals of the family of the *Vanessidæ* may be seen stopping to alight on its flowers; the Red Admiral (*Vanessa Atalanta*), and the Painted Lady (*Cynthia cardui*), may often be seen expanding and closing their wings, displaying, as if proud of their beauty, their gorgeous tints in the autumn sunshine. Towards evening many of the moths begin to crowd around its blossoms, to sip the sweet nectar so bountifully prepared for them. Foremost among them is the Silver Y (*P. gamma*), and perchance the Yellow and

Red-line Quaker (*O. macilenta* and *O. lota*), the Tawny Pinion (*Xylina semibrunnea*) and the rare Dotted Chestnut (*Dasyampa rubiginea*). *Plusia gamma* is also very fond of the flowers of the Verbena and Candytuft.

Lucerne and Clover fields are the haunts of many of our butterflies; the beautiful Clouded Yellow (*Colias Edusa*) and the Pale Clouded (*C. Hyale*) love to revel amongst the flowers of these plants, accompanied by their “yellow friend,” the Brimstone (*Gonepteryx rhamni*), also the Peacock (*Vanessa Io*), the Red Admiral (*V. Atalanta*), and the Painted Lady (*C. cardui*), with many of the Blues (*Polyommata*). These butterflies are also very fond of alighting on the various kinds of thistles. The Swallow-tailed (*Papilio Machaon*) is also a lover of clover-fields.

And now, after having given a few, and only a few, of the flowers which possess an attractive power to our “winged friends,” nothing remains but to fold up and despatch my MS., hoping, at some future time, to see a continuation of this in these pages by some entomologist more competent than myself.

Norwich.

R. LADDIMAN.

#### RECENT FORAMINIFERA.

IF we were called upon to declare what we considered the most difficult class of objects for the amateur microscopist to name satisfactorily, we should hesitate very little before declaring for Foraminifera; because classification and nomenclature have, until very recently (if not still), been in a most chaotic and unsatisfactory condition, and because handy text-books, with characteristic figures, and at a moderate price, are things which may be wished for, but most decidedly are not to be obtained. Figures there are, it is true, and learned papers, not a few, worthy of all respect; but they are beyond the reach of many, probably of most, of those who resort to the microscope as a recreation at the close of a day of monotonous toil.

Several times have we been urged to help our readers to figures which might, in ever so small a degree, contribute to lessen their labour with the Foraminifera. Time after time the pressure of other matter and other subjects has driven the Foraminifera, if not out of mind, at least so far back into the land of dreams, that it is only by dint of a firm resolve that we commence our sixth volume by the redemption of a sort of half-promise, in furnishing a series of figures of a few recent species, associated with the hope that they may really prove useful, and if so, that more will follow.

We do not purpose now, or in futurity, to give technical descriptions, nor to elaborate a scheme of classification—that task we leave in more competent



hands; all we design is to supply figures, since these appear to be the first want, and the only want that we have been called upon to satisfy. Hereafter some of the fossil forms may come in for a share of illustration; but all we intend to promise, for the present, concerns living species.

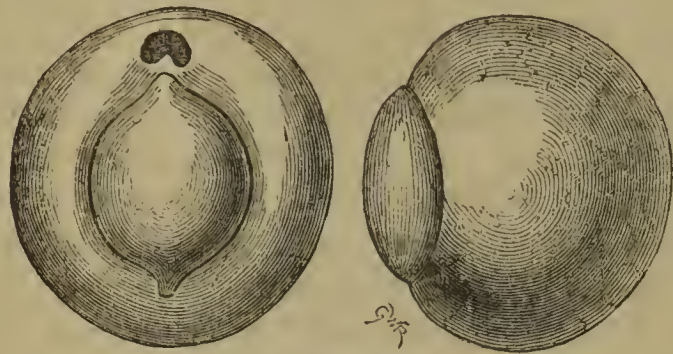


Fig. 17. *Biloculina sphaera*.

*Biloculina sphaera* (D'Orb.) is one of the rarer forms of the British coast. Mr. Brady says of it, that "in its fully-developed condition it is sufficiently distinguished from its allies by its spherical shape, and the large rounded outer chamber, which almost entirely embraces the inner ones" (fig. 17).

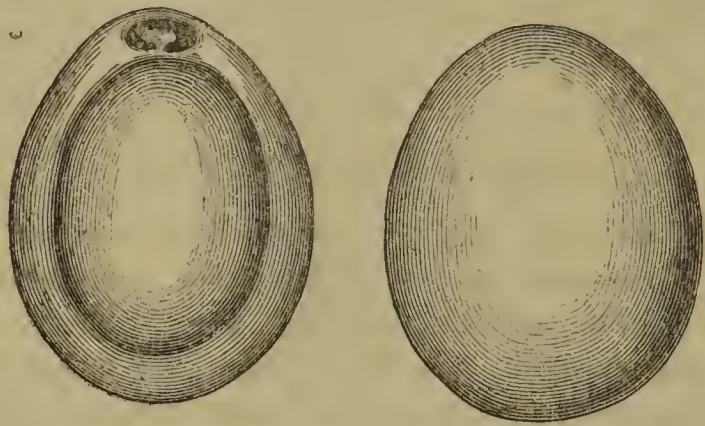


Fig. 18. *Biloculina ringens*.

*Biloculina ringens* (D'Orb.) is more common, and is found in the South, whereas the Shetlands is the only recorded locality for the last-named. In fact this species is found almost all around our coast, and is also recorded from the coast of Norway. Two or more of its varieties, which have ranked as distinct species, are almost equally common (fig. 18).

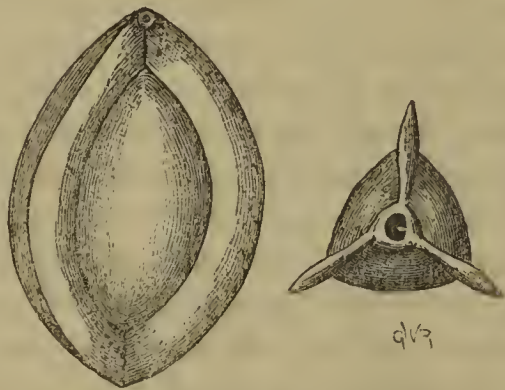


Fig. 19. *Triloculina tricarinata*.

*Triloculina tricarinata* (D'Orb.) is a common form in many seas, and is also found in a fossil state in tertiary deposits. Three keels or ridges

run along from end to end of the shell, and its length is about  $\frac{1}{32}$  inch (fig. 19).



Fig. 20. *Triloculina trigonula*.

*Triloculina trigonula* (Lam.) is the *Miliolina* of Williamson's monograph, and is found not only on the coast of the Shetlands, but also at Scarborough and several recorded stations on the South coast. It is about the same size as the last, and, like it, it is opaque, and of a porcelain-like appearance (fig. 20).



Fig. 21. *Planorbulina Mediterraneensis*.

*Planorbulina Mediterraneensis* (D'Orb.) may be regarded as the most common of its genus on our coast, and is the *Planorbulina vulgaris* of Williamson. It is very widely diffused, not only in the Mediterranean and around our own coasts, but also occurring in the Gulf of Mexico, Cuba, Teneriffe, the Antilles, and probably elsewhere (fig. 21).

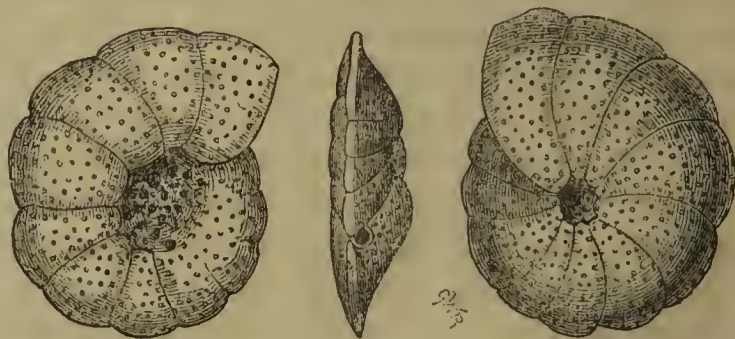


Fig. 22. *Planorbulina Ungeriana*.

*Planorbulina Ungeriana* (D'Orb.), from the Shetland seas, is a rarer species, and very delicate. "It has a deep central umbilicus, and the chambers are



extended at their outer edge into a sharp keel, giving the appearance of a narrow border running round the shell" (fig. 22).

Another species (*P. Haidengerii*) is known on these shores, but the foregoing will represent the genus.

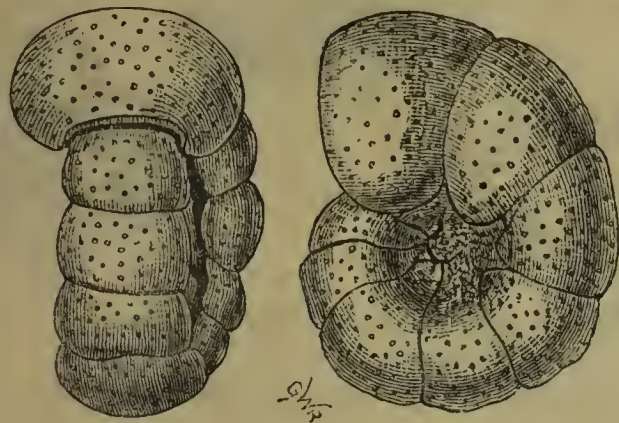


Fig. 23. *Anomalina coronata*.

*Anomalina coronata* (Parker & Jones), from the Shetland dredgings, seems also to be common all along the coast of Norway, and plentiful in the Mediterranean Sea at ninety fathoms. "This shell has the general aspect and bearing of the common *Truncatulina*, but it is not depressed, and affects a bilateral symmetry, the two surfaces being often nearly equal. The umbilici are deeply and broadly sunken, forming an almost ridge-like crown on each face of the shell. The aperture is a transverse chink at the base of the chamber."—(Parker & Jones.)

It has also been found fossil in the Tertiaries of France (fig. 23).



Fig. 24. *Pulvinulina repanda*.

*Pulvinulina repanda* (F. & M.) is the species called *Rotalina concamerata* by Williamson. This is certainly a beautiful form, and Mr. Parfitt states in his catalogue of the Protozoa of Devonshire that he has found it on oysters dredged off the South coast. It is probably not uncommon (fig. 24).



Fig. 25. *Pulvinulina Karsteni*.

*Pulvinulina Karsteni* (Reuss) certainly is a rare

form, found in a starved condition about the Shetlands, but apparently common in the chalk of Meeklenburg, where it was first detected by Professor Reuss (fig. 25).

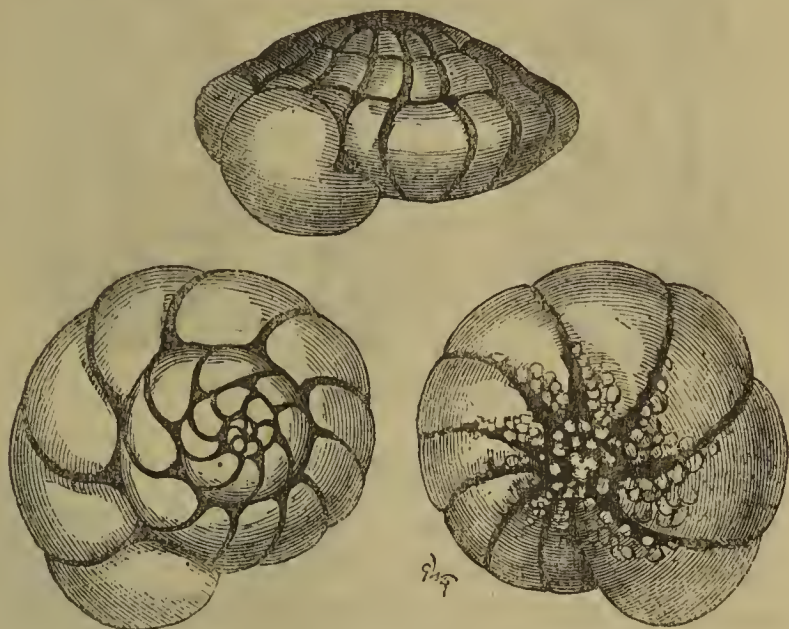


Fig. 26. *Rotalia Beccarii*.

*Rotalia Beccarii* (Linn.) is affirmed to be the most common of British Foraminifera, occurring in varying degrees of abundance on every part of the coast. The species has a very wide geographical range, but each locality appears to be characterized by the prevalence of some one variety. This also appears to be readily obtained from oyster-shells by carefully washing them, a plan which Mr. Parfitt has certainly adopted with considerable success (fig. 26).

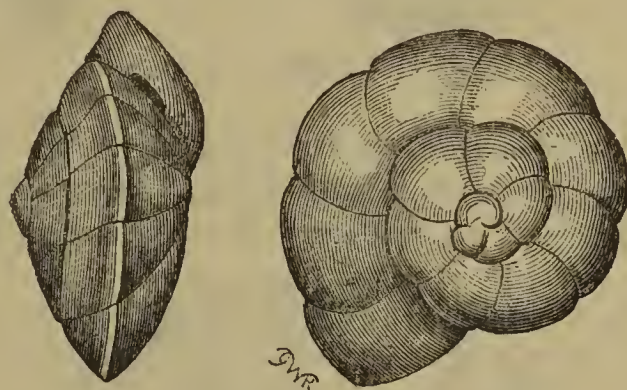


Fig. 27. *Rotalia orbicularis*.

*Rotalia orbicularis* (D'Orb.) is considered by some authors as only a deep-sea variety of the last-named species. Although common in deep water in the Red Sea and the Mediterranean, it seems to be as rare on our coasts as the other species is common, since it is only recorded from the Shetlands and the Irish Sea. "It is a thickened rotaline form, presenting in profile a trochoid appearance, rising to a point on the upper, and very convex on the lower surface. The septal face is narrow, and shows few or no perforations."—(Brady.) The diameter is  $\frac{1}{100}$ th of an inch (fig. 27).

*Nonionina turgida* (Will.), the *Rotalina turgida* of Williamson's monograph, is probably a very common northern species, abundant around the Shetlands,



but not found on the English coast, or but very rarely at Whitehaven (fig. 28).

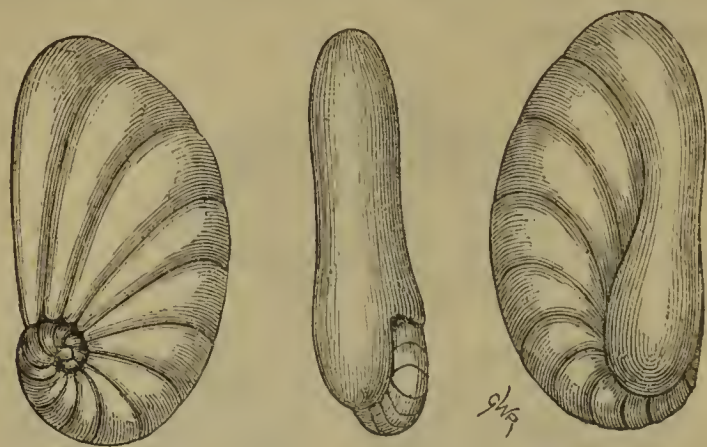


Fig. 28. *Nonionina turgida*.

*Nonionina depressula* (W. & J.) is the *N. crassula* of Williamson, and "one of the smallest, as well as the most common, of the equilateral nautiloid Foraminifera," being found almost everywhere on the coast, and in some stations abundant. This also Mr. Parfitt obtained from washings of oysters; and he observes, "It is the most common of all the species I have met with" (fig. 29).



Fig. 29. *Nonionina depressula*.

*Nonionina stelligera* (D'Orb.), on the other hand, is very rare in the Shetlands' dredgings, but seems to be tolerably abundant in the Mediterranean, on

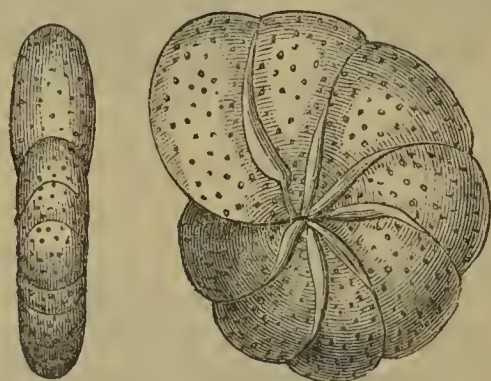


Fig. 30. *Nonionina stelligera*.

the Norwegian coast, and in the Arctic seas. Some regard it as a variety of another species, not recorded in the British seas (fig. 30).

*Globigerina bulloides* (D'Orb.) must not be forgotten; and with that our present list and figures terminate. Of course it is a very common species, and one recently invested with considerable interest, since it is completely cosmopolitan in the deep, deep sea-bed of the Atlantic, almost here, there, and

everywhere; fossil in the Vienna basin and the Suffolk crag. Indeed, it is probably identical with

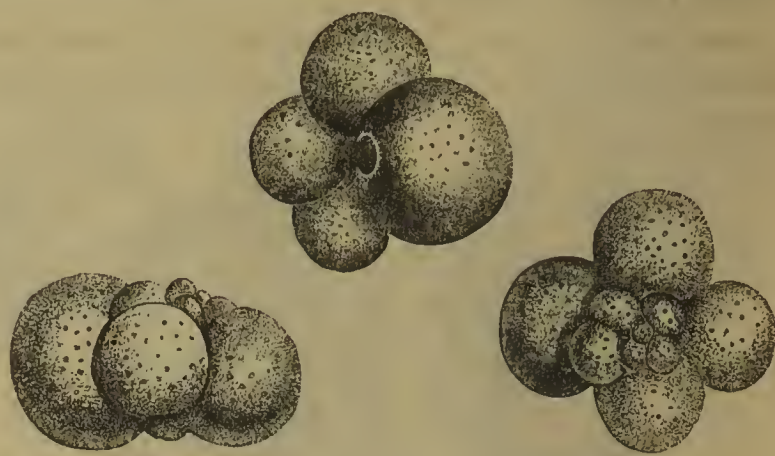


Fig. 31. *Globigerina bulloides*.

the common *Globigerina cretacea* of the chalk (fig. 31).

## THE FIELDFARE.

(*Turdus pilaris*.)

OUR earliest recollection of the Fieldfare is always associated with the time when, first intrusted with a gun, we crept stealthily over the crisp snow at Christmas-time, and, under cover of a straggling hedge, took a "pot shot" at every "Felt" we could get near.

In this kind of shooting—"hedge-popping," call it what you will—there is at one period of our lives something wonderfully exciting. The charm of the newly-acquired gun; our intense desire to make a bag; our diffidence in firing at anything on the wing, for fear of missing it; and the attractive size of the Fieldfare and Redwing, which "sit up well," and offer a good mark, all combine to render such an amusement, at such an age, particularly enjoyable. Indeed, we are almost inclined to doubt whether, at any after-period of life, so much real enjoyment is ever derived from any other kind of shooting. Those who have not tried it must not suppose that the sport is tame,—that the Fieldfare is easily approached, and sits quietly upon his perch until the shot brings him down. No such thing; he is uncommonly wary and suspicious, and after he has once caught sight of you, it is by no means an easy matter to get within shot of him. We used to think at one time that it could scarcely be more difficult to stalk a deer than to stalk a "Felt"; and many a time have we crawled until our back ached, and followed a noisy flock from tree to tree, and from hedgerow to hedgerow, until we had well-nigh despaired of a shot. But when perchance a straggler remained behind, and his chattering note betrayed his whereabouts, we had our triumph and our reward; for we took a steady aim at him from behind a tree, and he came toppling down amid a shower of twigs and leaves.

When walking home in the twilight with a pocket



full of such "game," we had leisure to speculate upon the extraordinary distance which the Fieldfare must travel to reach this country, and upon the causes which could lead to such a wonderful journey.

With us the bird is but a winter visitant, arriving in October and departing in April. Its summer haunts are in Sweden, Norway, Lapland, Poland, Prussia, Russia, and Siberia,\* where, unlike our familiar resident thrushes, it is gregarious, and breeds in colonies.

similar to those of the Blackbird, and even more so to those of the Ring Ouzel."

Mr. Hewetson states (*l. c.*) that the Fieldfare is the most abundant bird in Norway;\* and the late Mr. Wheelwright has remarked that in Lapland, next to the Brambling (*Fringilla montifringilla*), it is the commonest bird in the forest.

Strange to say, in the latter country it appears to depart somewhat from its usual habit in nesting, for Mr. Wheelwright says: "They did not breed *here* in colonies; for although the nests are seldom



Fig. 32. THE FIELDFARE (*Turdus pilaris*).

Mr. Hewetson, writing of its habits in Norway, says,† "The nests, often two hundred or more within a small space, were at various heights from the ground, from four feet to thirty or forty feet or upwards; they were for the most part placed against the trunk of the spruce fir; some were however, at a considerable distance from it, upon the upper surface, and towards the smaller end of the thicker branches; they resembled most nearly those of the Ring Ouzel; the outside is composed of sticks, and coarse grass and weeds, gathered wet, matted with a small quantity of clay, and lined with a thick bed of fine dry grass."

The eggs, usually five or six in number, are "very

far apart, we never found two in the same tree."†

Some few instances are on record of the Fieldfare having remained to breed in Great Britain; but such instances are very rare, and must be looked upon as purely accidental. The counties in which nests are reported to have been found are Sutherland (*St. John*), Yorkshire (*Yarrell*), Kent (*Yarrell*), Surrey (*Blyth*), and Hants (*Bree*).

In Orkney and Shetland the Fieldfare is a regular winter visitant, and in the former island it has occasionally been known to stay during the whole year, although never found nesting there.‡

As a rule the Fieldfare arrives in England during the third week of October, and generally later than

\* The Fieldfare, it appears, is not found in Iceland, although the Redwing is a regular migrant there.—Prof. A. Newton, in Baring-Gould's "Iceland; its Scenes and Sagas," Append., pp. 408 and 421.

† "Eggs of British Birds," i. p. 58.

\* See also Mr. Norman's "Nat. Hist. Notes in Norway," *Zoologist*, 1864, p. 8865.

† "A Spring and Summer in Lapland," p. 282.

‡ Baikie and Heddle, "Hist. Nat. Orcadensis," 1848, p. 34.



the Redwing. Instances are recorded of Fieldfares having been seen in August and September; but in several cases, it was found, on inquiry, that the observers had mistaken a flock of Mistletoe Thrushes for the species under consideration, and doubtless this mistake has been oftentimes committed. We lately received a letter from a friend near London, informing us that a flock of Rock Thrushes (*Petrocincla saxatilis*) had been seen in his neighbourhood by two gentlemen of his acquaintance, one of whom was stated to be "well up in English birds and very observant." Such an interesting and at the same time startling piece of news, was enough to put any ornithologist on the alert, and, notwithstanding our impression that the Rock Thrush is not gregarious, and is so extremely rare in England that only one instance of its occurrence here is recorded, we determined from curiosity to ascertain if possible what species had been mistaken for it. Accordingly, armed with our friend's letter, and furnished with the names and addresses of the observers, we called upon them in turn with a skin of the Rock Thrush in our pocket. From the descriptions which we then received of the appearance, actions, flight, and note of the birds which had been seen, there could be no sort of doubt but that the species was that of our old friend the Fieldfare, and the production of the skin of the Rock Thrush proved conclusively to the observers that they had been mistaken. Now, had we rested content with the assurance that a gentleman "well up in English birds" had seen the Rock Thrush, or a flock of Rock Thrushes, at such and such a place, and had we on the strength of this assurance published the fact in one or other of the natural history journals, it is difficult to say what amount of mischief might not have resulted from supplying such data for future ornithologists to found conclusions on. Those who interest themselves in collecting and publishing accounts of rare birds, cannot be too careful in first ascertaining that the evidence upon which their statements are founded is incontestable.

But to return to the Fieldfare: few birds seem to attract so much attention at the season of their arrival in this country. During the month of November we see every year numberless short paragraphs in the *Field*, the *Zoologist*, and other natural history journals, in which the "first appearance" of this species in various localities is duly chronicled and commented on. For six months in the year the Fieldfare is generally dispersed, and tolerably common in most parts of the country. Towards the end of April it disappears, retiring northwards to its summer haunts.

During its stay with us it frequents the open country, feeding on the small meadow slug (*Limax agrestis*), of which it seems particularly fond, varying its diet with worms and beetles. As the weather

becomes colder, and the ground harder, it resorts to the hedgerows to devour the fruits of the dog-rose and white-thorn, commonly known as "heps and haws," and in such situations, traces of its visits are always to be found in the bright red droppings which are noticeable on the ground hard by. The berries of the Ivy and Rowan-tree are also eagerly devoured and in the absence or scarcity of such food, Fieldfares have been observed to attack turnips, digging at the exposed portion of the roots, and chipping off small pieces, which they swallowed with avidity. Several birds which were shot while thus engaged, were found to have the stomach completely filled with such chips. It is probably not often that the Fieldfare is driven to such extremities, and compelled to steal turnips like a hungry vagabond. The practice no doubt is a mischievous one, as the farmers will tell us; for the water lodging in the holes which are pecked by the birds, the roots are rotted, and the crop is seriously impoverished.

We can make allowances, however, for such damage, when we consider what our own feelings would be under such hungry circumstances.

J. E. HARTING.

#### STUDIES FROM THE ANTIQUE.

THERE is sometimes a good deal of amusement afforded, if not much instruction, by turning over the pages of those old books which professed to treat upon Natural History a century or so ago. It is possible that we shall occasionally come across facts and observations worthy to be placed side by side with more recent records, but in the great majority of the works sold as "Natural Histories" at the time to which we refer, the worthy authors, who we would fain respect if we could, really appear to have put to very little service the powers of observation or reflection which they possessed. We are irresistibly tempted to laugh at many of the statements *they* made with all due gravity, and the conclusions deduced from the facts (or supposed facts) which they have noted, are often, too, fully as comical. We are accustomed to make apologies for our predecessors in the study of Nature, yet really, after all that can be said in extenuation of their various errors, we cannot help thinking that they ought to have done better. The discoveries of more recent times were within their reach as much as they are within ours, and the strange way in which some of these so-called fathers of science missed things which are palpable to the merest tyro of a naturalist now furnishes an illustration of the homely proverb that "You may take a horse to the water, but you cannot make him drink."

A curious old book lies before me which suggested these remarks. It bears date 1763, rather more than a hundred years since,—published, too, let it be noted, "in St. Paul's Churchyard, at the



Bible and Sun." This work consists of several volumes, and calls itself, pretentiously enough, a "Natural History." Whatever else may be said against the author, he can hardly be accused of egotism; the writer is carefully, perhaps too carefully, kept out of sight within the leaves of it, though the title-page informs us that its compiler is a certain R. Brookes, M.D., also the author of a book on the Practice of Physic. One of these volumes is devoted to the natural (or rather unnatural) history of insects, and we discover on inspection that it is indeed comprehensive, for it professes to treat of the insects occurring in all parts of the globe, in which division the writer includes spiders, centipedes, and scorpions. After an introduction, wherein he treats of insects generally, their structure and habits as far as he knew them, which introduction closes with the reflections so usually indulged in by eighteenth-century naturalists, about insects filling up "chasms in the scale of being," being allowed to seize as great a quantity of happiness from the universal stock as was consistent with the universal plan, and "yet in some measure they were formed for the use of man." After these speculations, Dr. Brookes plunges *in medias res*, by discussing insects in general. His first rude attempt at classification is the division of all insects into three sorts, the least honourable being put first, viz., caterpillars, which he ranks by the mselves as a humble race of trotters, less agile and more legged than his third division, choosing here to disregard the fact he afterwards notices, that caterpillars do not remain such, but proceed to a higher form of life. "Caterpillars have feet before and behind, which enable them to move forward by a sort of steps made by their fore and hinder parts, and also to climb up vegetables. Behind, their broad palms are beset almost round with sharp small nails, to hold and grasp whatever they are upon." Then the second sort is comprehensive in its grasp, including every insect which has wings. These, says our author, "lead a more luxurious life, and transfer themselves from place to place with rapidity." His third sort are ants, spiders, and others, with bodies divided into two or three portions. "Of all the race of *reptiles* these seem to be endowed with the greatest share of sagacity."

The comments on the habits and structure of insects are original and curious. Insects—or at least most—have antennæ or feelers, to keep their eyes clean! A remarkable piece of dexterity it would be in the majority to touch or brush the eye with this organ. "Some, however," says Dr. Brookes, "are of opinion that they clean their eyes with their fore-legs," which is probable. About galls and the insects they contain, his ideas are very cloudy. Little "gems" or "buds" appear on oak-trees at certain times. Into the heart of these the parent insect thrusts an egg. This produces a

maggot, which eats a small cell in the centre of the bud. "Other trees have knobs thus formed, which generally grow in or near the rib of the leaf." He believes the flies which are produced from these galls are allied to what are called blue-bottle flies! Many insects, he supposes, are at first a "sort of worms," with or without feet; for the luckless individuals of the latter character he sees a provision made, they are "under the care of their *dams*, who supply them with food." Those provided with feet, needing no guardian, go "of their own accord," to the leaves of the tree most suited to them. Yet, he notes, all caterpillars do not feed on leaves. There are some, he finds, that feed only upon wood. Nay, more strange still, "it is now generally believed that there is another sort nourished in stones themselves," a belief which turns out to be a blunder! Dr. Brookes supposes there are (in 1763) about three hundred kinds of caterpillars known; this seems a good number, but he is using the word caterpillar in the broad sense, as of the second stage of any insect. "The curious are still making new discoveries," he reports with satisfaction; and another hundred years added to those now past since his day will not exhaust the field of discovery of its treasures. Are modern naturalists sufficiently *curious*, in the old sense of the word? It may reasonably be doubted.

Having thus paved the way for his further investigations by these preliminary remarks on insects, he proceeds to discuss them in a series of chapters, beginning with the beetles, and closing with the ants. The lists given in each are marked by the singular absence of method which is so conspicuous in the older naturalists. In speaking of any species, too, Dr. Brookes troubles not to distinguish particularly as to their locality. Some he notes as being foreign, others as being English, but the bulk are left in doubt. For fear, however, lest a portion of the foreigners should think themselves neglected, he devotes a chapter especially to the enumeration of North American and West Indian insects. Here ants, beetles, butterflies, caterpillars, locusts, spiders, and worms march after each other in alphabetical order, the descriptions of some being particularly short, as in the following specimen:—"The *great brown moth* has wings three inches and a half long and one and a half broad."

Beetles the author of this work believes to be provided with wing-eases to preserve the wings from hard bodies which might damage them when the insects are delving the ground, or gnawing wood, or making themselves houses and nests,—this latter function of beetle-life having apparently ceased in the nineteenth century! Also, "Beetles have a great aversion to roses, whose smell they cannot bear, and some affirm it will kill them. They are naturally fond of ivy, and delight to get under its leaves." Amongst the beetles, and indeed through all the



orders, we have a singular mixture of Latin and English names. His "brass-beetle" appears to be the well-known Rose-beetle, or Rose-chafer. The children's favourite, the Ladybird, figures as the Lady-cow, and three species are described. Of *Crysomelas* he describes thirty-two kinds, distinguishing one from another mostly by size and colouring. Of weevils he records thirty-three. The economy of the Cockchafer he illustrates at some length, calling it the May-bug or Dorr. "It is thought that the females make holes in the earth with their tails, but it is uncertain whether they lay eggs or small worms." Dr. Brookes describes the larva very particularly. He also knew that they passed three years in that state. In Ireland, he observes, they have sometimes done much damage, and in one case the inhabitants set fire to a wood some miles in extent, to prevent their proceeding to others at a distance. A thoroughly Irish remedy! The doctor, in treating of the other species of beetles, alludes to some kinds which he calls "burn-cows," or "burst-cows." It would appear that he has in this part of the chapter a reference to the rapacious *Carabi*, which he believes to be very venomous to cattle. After the *Staphylini* he links on to the beetles the cockroach, the mole-cricket, and other species of this family, closing with grasshoppers and locusts. Perhaps the most amusing part of this chapter is a description and accompanying figure, obviously referring to the larva of a dragon-fly; this the author calls a "water-cricket." The wings, he safely remarks, seem to be useless for flying, still "they help to raise the insect up. It is commonly seen sitting upon water-plants, and is said to sing like the land-cricket."

Cicadas, bugs, aphides, and cocci have a chapter to themselves.

The *Notonectæ* are water-bugs. Of what he calls the true *Cimices* he enumerates forty. Much of this is devoted to the consideration of the insects producing kemes and cochineal.

Getting amongst the *Lepidoptera*, this well-meaning naturalist is thoroughly beclouded. Mealy-winged insects, under which he classes what he calls the diurnal and nocturnal butterflies, have a chapter to themselves, at the commencement of which it is stated that some of them proceed from worms, some from caterpillars; yet further on we find a heading, "Of eaterpillars," where certain species of *Lepidoptera* are arranged, the transformations being noted as chiefly important, and the perfect insects appear quite subordinated to them. It would naturally occur to us that this isolation was most unjustifiable, but Dr. Brookes seems to have acted on the principle that if the caterpillar was known then the species was to be treated under that heading. Other butterflies and moths, whose changes had not been noticed, take rank by themselves. Here we find the doctor again gives utterances to some rather sin-

gular notions. "Butterflies," says he, "when they design to fly a considerable distance ascend and descend alternately, but their flying is not very graceful." Subsequent generations of butterflies have improved in this respect if this statement be true, for we consider now that many species are graceful fliers. The antennæ puzzle him much. "Some butterflies carry their feelers like the ears of hares; some of them lie down on the body; others bear them sometimes upright and at other times lie them down." The use of them he is doubtful about; reverting to a former idea, he thinks perhaps they may serve to clean the eyes or to guard them; but some think that, "like the staffs of blind people, they give notice when they are going to strike their heads against any object!" In dividing the butterflies and moths, he breaks them up first of all into sections, according as they are large, middle size, or small; then a few species are described under each, by the markings and colours principally, no name being given, but a number attached.

In the part devoted to caterpillars the writer brings out clearly the distinction between a caterpillar and a palmer-worm, still somewhat obscure to many. "Caterpillars," says Brookes, "are of two principal kinds, shelly and membranous," these he again subdivides into classes, according to their show of legs; the fourteen-legged individuals are he believes, particularly industrious! With smooth caterpillars he associates the thorny or spiny; but the hairy Dr. Brookes ranks apart: these he denominates palmer-worms—a name not yet obsolete in some parts of the country, and applied loosely to any destructive insect. "They wander (the latter) from place to place, like palmers or pilgrims: some call them bear-worms (woolly bears in modern phrase), because they are all over hair, and others millers, for what reason is uncertain." The statement is probably correct, that hairy caterpillars, with some exceptions, move about more fearlessly than smooth-bodied ones.

From chapter 12, which treats of scorpions, jelly-worms, hog-lice, and *Centepus*, we find that modern usage has altered slightly the name of the last species—by "jelly-worm" a millepede is intended. Other singularities might be quoted, but I forbear; enough has been written to show that it may be profitable, and it is not very tedious, to examine, in the light of the nineteenth century, the would-be scientific work of an old naturalist.

J. R. S. CLIFFORD.

CAT AND FIGS.—In some of the back numbers of SCIENCE-GOSSIP instances are given of the peculiar tastes of some cats. We had one some ten years ago which had a strong penchant for figs, the presence of which she would detect even if wrapped up in paper in a person's pocket. She ate them with evident gusto.—*R. T. M. A.*



## ZOOLOGY.

CATS.—In your Notes and Queries of last month you gave some curious instances of sagacity in cats. I can add a few which may amuse as well as instruct some of your readers. I give cats credit for more power of thought than is usually believed in. For instance, a friend of mine, in this neighbourhood, has a young dog and a cat. Puss was left totally without education, but the puppy, I suppose, because he was considered a more promising pupil, received careful instruction in the art of begging. Now, the fact I wish to record is this, that the cat, without any teaching, and simply from observation, discovered that that was a means of obtaining food, and took to sitting up too. Another case seems so improbable that I suppose many will doubt its truth. Indeed, I would not believe it myself until I had seen the performance with my own eyes. Several months ago I was dining with a relative at Wandsworth Common, and the dining-room door being open I heard a single knock at the garden-door. This was repeated several times, and one of the family remarked, "there is Tib." My relatives were used to this knocking, and they thought no more of it than that it was an amusing habit; but it seemed to me so remarkable that I made inquiries about the animal. She was a young thing just arrived at cat-hood, had never been taught, and no one can say how she first acquired the habit; but when she wants to come in from the garden, and finds the door closed, she always knocks once, and repeats the knock more and more rapidly until answered. The door has glass in the upper part, so the knocker is low, and she just reaches it by standing on her hind feet; she leans one fore-paw against the door, and uses the knocker with the other (as the maids say) like a "Christian." She continues the habit to the present time, having grown up and become the mother of some promising kittens. If not trespassing too much on your space, I might mention a singular accident which befel a cat of mine a few weeks ago. At my premises, in London, my foreman has a fine cat which was noticed to be in a very miserable condition one day, evidently in great pain, and having what the men thought to be a worm protruding from one nostril. She was caught, and after a good deal of pulling, as you may imagine, this was got out, and proved to be a rat's tail, minus the skin, but otherwise intact. She must have bolted this, big end first, and her stomach rejecting it, it passed up the throat, but was "shunted" on to the wrong line, and so passed into the nostril, where it became fixed. It just strikes me that some of your sceptical readers may designate this a still greater proof of feline sagacity, inasmuch as the cat rejected a *tail* she could not swallow.—James Fogan.

RICHARD'S PIPIT IN NORFOLK.—Through the kindness of Mr. Gunn, a bird-stuffer in this city, I had the opportunity, a few days since, of examining a beautiful adult male Richard's Pipit in the flesh. It was killed on, or a day or two before, the 3rd December, near Yarmouth, whence so many rare birds have been obtained, and is, I believe, the fifth Norfolk example on record, all of which occurred about the same locality on the following dates:—22nd November, 1841; April, 1842; 24th April, 1843; 28th December, 1866, and 3rd December, 1869. Its stomach (like the 1842 and 1843 birds) contained the remains of Coleoptera, one small species of ladybird being entire; it weighed 200 grains (19 grains less than half an ounce). As the measurements of this species, given by various authorities, differ so considerably,—Macgillivray stating the total length, from bill to tail, to be  $6\frac{3}{4}$ ; Yarrell,  $6\frac{3}{4}$ ; Morris,  $6\frac{3}{4}$ ,  $7\frac{1}{4}$ ,  $7\frac{1}{2}$ , and 8 inches; and Mr. Fisher (*Zool. O.S.*, p. 181),  $7\frac{1}{4}$  and  $7\frac{5}{8}$ ,—the last two measurements being those of the 1842-3 birds mentioned above,—I append the principal measurements of the two most recent Norfolk specimens, taken in the flesh (and not from skins or stuffed specimens, as I fear some of the others were), adding for comparison the corresponding measurements of the other three species of pipit as taken by Mr. Gunn, also from birds in the flesh.—*J. Southwell, Norwich, December, 1869.*

[As we never insert tables or lists under any circumstances, the table alluded to is omitted.—*Ed. S. G.*]

LONGTAILED TITMOUSE (*Parus caudatus*, Linn.).—This species is widely distributed in Turkey in Asia Minor and Europe. They are scarce in numbers, and not many of them have yet been taken. This bird is much lighter on the crown of the head and front than the bird found generally in South-western Europe; the young are also lighter in colour. They are similar in habit and are found in the same localities as the South-western bird, and are constant residents in Turkey.—*The Levant Times.*

LAUREL-BERRIES FOR DESTROYING THRIPS.—Two years ago, when discussing with a clever practical man the merits of the various known and suggested remedies for the destruction of the thrips, he said that once he had bruised a quantity of laurel-leaves in a house occupied with specimen Azaleas, and the action of the poison disengaged in the process of bruising had such an effect upon him as to produce stupefaction, and render him incapable of getting out of the house without assistance. The effect upon the Azaleas was even more disastrous, for they lost all their leaves, and several plants were a long time in recovering from the injury received. The thrips were killed certainly,



but at too great a cost. Whether or not the berries will produce the same effect, I am not able to say; but I would certainly advise extreme caution in their use, notwithstanding Mr. Bowlby saying they can do no harm. If we can learn the exact quantity required to destroy the thrips without injury to the vines in a house of a given capacity, the receipt would be valuable, because of the cheapness of the berries. After all, no system of keeping the vinery free from insect pests can equal a thorough cleansing of the vines when they are at rest with soap and water, and burning sulphur in the house. It is scarcely necessary to say that the house must be cleared of everything except the vines.—*H. Buttery, in "Gardener's Magazine."*

MARSH TITMOUSE (*Parus palustris*, Linn.).—This species is generally distributed in Turkey in Asia Minor and Europe, but, although it is not unfrequently met with, it is not nearly so numerous as the blue or great titmouse. It is partial to old woods in damp situations, where it mostly continues the year round, and it makes its nest principally in holes of decayed branches of trees. In the spring-time it is seen busily engaged on a trunk or branch of a decayed tree, decayed fence or gate, or gate-post, or decayed wood, labouring away for hours with its bill, detaching the decayed wood, and making room enough in the interior to securely hold its little nest. The entrance is just made large enough to admit the old birds, and the interior is scooped out more roomy for their habitation. Their nests are found mostly in decayed branches of alder, whose interior is soft and easily removed. They are partial to feeding on the alder, are rarely seen in the open country or on bare mountain districts, except in the winter, when they scatter and travel far and wide in search of insect food. They are constant residents in Turkey.—*The Levant Times.*

YAMA-MAI SILK-MOTH.—The editors of the *American Entomologist* announce that their own experience with this Japanese silkworm during the past summer was very unsatisfactory, and, they add, "we learn from Dr. Wallace that experimenters met with but poor success in England in 1869, though an Austrian Baron succeeded in rearing twenty thousand cocoons."

NEW FOOD FOR SILKWORMS.—The *Illustrated Sydney News* says that "a native shrub has just been discovered both on Port Philip Island, and the shores of the Western Port Bay, which has proved far better for feeding silkworms than the mulberry." It is a great pity that the name of the plant was not given, or some particulars or description of the plant, so that it might be identified. Surely the

subject is of sufficient importance to have warranted a little extra trouble.

PETRIFIED MAORIS.—The *Southern Cross* has been furnished with the following by an occasional correspondent:—"The annexed particulars I have had sent to me from Raglan, and being rather a wonder (though I believe there are subterranean passages extending for a long distance at the Three Kings) I consider you might deem it worth insertion. About six or seven years ago Mr. Richard Todd, Government surveyor at Raglan, while walking on the shore at the south head, and being close under the mountain called Karuni, discovered, amongst a large number of immense boulders, one that was very beautifully carved. I have been informed Mr. Todd took a drawing of it. It had the appearance, said Mr. Todd, of having been executed a very great number of years. Two stone chisels and an axe-head were found close to it. Owing to the encroachment of the sea, and action of the tide, this immense boulder had been displaced from its original position, and disclosed the entrance to a most wonderful cavern, running a very great distance under the mountain. On this discovery being made known to the settlers by the natives, a party of Raglan people, having provided themselves with lamps and torches, penetrated the cavern for at least half a mile, and were obliged to turn back, they having commenced their research too late in the day. The cavern has been described as a most wonderful one, very lofty, apparently in places two hundred feet high, with immense stalactites which seemed to be forty or fifty feet in length, and which had a very grand appearance, from the reflection of the lights. The party were completely wet through from the dripping of water from the roof. At about half the distance they traversed a very large, curiously-shaped rock, it having the appearance of a large altar, seven steps about two feet six inches high forming the approach to the table or altar. From the foot of this rock a very powerful stream of water wells up with great force—it apparently having a subterranean passage. The cavern at this spot is described as being thirty feet wide. At this spot were discovered the bodies of eighty-seven Maoris, all being in a perfect state of preservation, in fact, petrified into stone, even their mats having undergone the same process. The parties who placed these bodies there must have evidently been aware of the properties of the dripping water. There is a native settlement close by the spot, and some very old natives live there, but they have no knowledge of the existence of the cavern, but said they have a tradition of a very powerful king having his headquarters at their settlement, viz., Karuni. Mr. Todd, when he discovered the stone, had an idea that it had reference to the burial-place of some great chief.—*Communicated by Dr. L. Lindsay.*



## BOTANY.

TREES.—Amongst the trees of the wood there is a vast variety; the sturdy oak, the flexile willow, the solid maple, the graceful ash, the terraced cedar, with cones upraising through each grassy-looking lawn of tender leafery; the larch, in lieu of bells hanging its scarlet blossoms from every pointed arch of its green pagoda; the stiff stout holly, disdainful of the breeze; the fidgety aspen, all in a flutter at the faintest sigh; the spacious chestnut, enclasping the globe in its bountiful branches; the strict, solemn cypress, with every oppressed twiglet pointing straight up to heaven. As with the form, so with the bark or the timber: the ebony sinking like stone, the cork on the crest of the billow; the elder so soft and spongy, the box in its firm structure retentive of the finest engraving; the homely deal, the thyme-veneer emulating the spots of the panther, or the plumes of the peacock,—beautiful some, but useful all, and not to be interchanged with advantage. An aspen bow would be no better than a yew-tree lance; you do not choose the fir for the prince's table; and even England's oak would make a sorry mast for "some great ammiral."—*Dr. James Hamilton's "Pearl of Parables,"* p. 154.

"SYMPHYTUM TUBEROSUM," p. 138.—This habitat has been copied into the "additions, &c.," to the admirable Middlesex Flora, p. 425, without comment. Now, the plant is well known to occur in the neighbouring county of Herts, and I myself found it (May, 1867) in the narrow strip of Herts which is figured in the Flora map with East Barnet for its centre. Is the vicinity of this spot the one intended by Mr. White? It would come within his description of a few miles north of London.—*R. T. M. A.*

SAXIFRAGA HYPNOIDES.—Is it common to find *Saxifraga hypnoides* flowering a second time in the same year? So far as this locality is concerned, I can answer that such second inflorescence is of very rare occurrence. I have never observed it until the present season, when I found this species flowering abundantly in November on our Black Mountain. I gathered some specimens; the flowers were large and fine, but invariably sessile, seated in the midst of a rosette of three-lobed leaves. Our winter so far has not been unusually mild, but rather the reverse.—*S. A. S., Belfast.*

CURIOUS FORM OF THE COMMON REED.—Southernness is a small headland situated in Kirkcudbrightshire, on the shores of the Solway. As its name imports, it is the most southerly point in that part of North Britain. In its neighbourhood are many objects worthy the attention of the geologist and botanist. The granite, the carboniferous limestone, and some of the Silurian beds are strangely intermixed, contorted, and upheaved. Many fossils may be picked up, and whole beds of corals seen.

For the botanist there is the very rare plant, *Epimedium alpinum* (barren wort), growing most luxuriantly in the grounds of Arbigland, seemingly quite wild, but no doubt planted at some time. But my intention is not to speak of the general botany of the district, but to mention a peculiar state of one particular plant. Walking along the sea-shore one day I came upon several specimens of the common reed (*Arundo phragmites*) lying quite prostrate or ereeping along the ground. Not expecting that this was ever its natural state, I endeavoured to account for it by supposing that some unusually high tide had overflowed it, and that, breaking it down, it had not regained its upright position. It seems, however that the stems do sometimes grow naturally in this prostrate state. Sowerby, in his "British Grasses," says, "sometimes, though rarely." In the "Phytologist," old series, vol. i., p. 146, it is stated that this form occurs on some of the land-slips in the Isle of Wight. It seems to have been first noticed by Ray, in his "Synopsis," in which he speaks of "*Gramen arundinaceum*, 30 pedes longum." This does seem a monstrosity, but the truth is even stranger than this, for some specimens have since been found at the same place fifty feet long. The Southernness plants were certainly not equal to these—very little longer than the common upright ones, but they had the same peculiarity, though lying along the ground, of not rooting at the joints, and of making no attempt at flowering. Perhaps some of the readers of SCIENCE-GOSSIP may have observed this state of the plant in other localities. I only wish to record Southernness as a place where it may be found.—*R. W.*

A QUAIN NAME.—Most people who have had anything to do with the Canadian blood-root (*Sanguinaria Canadensis*) must be aware of the dark red blood-like juice of the bruised or broken roots. On receiving a list of plants the other day, this plant was called "the bleeding nun," which, though very fanciful, is certainly indicative of the peculiarities of the plant, and one where the *reason* for the name is apparent. Perhaps it is generally known, that this juice, or *blood*, is highly charged with raphides.—*Thomas Williams, Bath Lodge, Ormskirk.*

POTENTILLA FRUTICOSA.—As this plant is considered "rare," perhaps I may be allowed to mention an unrecorded station for it. Some years ago, I detected it sparingly on limestone rocks, about one hundred yards due east of Wether Kellet Church, about eight miles beyond Lancaster, having been acquainted with this plant as a shrubby plant for many years. It was by the merest chance it was recognized, so great was the disparity between the *wild* plant and the cultivated one. On the limestone crags overlooking the village of Kellet, may be found the beautiful *Ophrys muscifera*.—*Thomas Williams.*



## MICROSCOPY.

**VULCANITE CELLS.**—Your correspondent has omitted to notice the Vulcanite Cells which are now used by many microscopists in preference to any other form of cell. They are fastened to the slide by marine glue, and are perfectly free from leakage. They can be obtained of any thickness from Mr. S. A. Pumphrey, 21, Paradise-street, Birmingham, who sends 100 assorted to any address for thirteen stamps.—*R. H. Moore.*

**ADAPTATION OF MICROSCOPE.**—For applying the microscope to the examination of objects, contained in aquaria, or too large to be placed upon the stage of the instrument, I have lately adopted a simple piece of apparatus, which was constructed for me by Mr. Crouch, of London Wall, at my suggestion. It merely consists of a metal plug, threaded to screw into the horizontal arm in place of the body, and supporting, at right angles to itself, a tube lined with cloth just large enough for the body to slide in. The coarse adjustment rackwork affords a means of varying the height within certain limits, and the body slides easily enough in the tube for focussing. If the direction of the latter be reversed (*i.e.*, so that the eye-piece end projects over the stage) the instrument may be inclined at any angle over large objects laid on the table. Special forms of microscopes for aquaria have been devised, and any one who can afford to purchase them will scarcely regret the outlay—and in many patterns of students' and educational instruments the horizontal bar has been superseded by improved arrangements; but there may be some persons to whom this hint, how to increase the employment of the microscopes they possess, at a trifling cost, may not prove unacceptable. It is hardly necessary to add that this contrivance answers best with the lower powers.—*William C. Atkinson.*

**"PSEUDOGONIDIA."**—Some days ago, while examining certain freshwater algæ under the microscope, I observed a rather curious phenomenon, which I wish to record in the pages of this magazine. I found among the filaments of the *Vaucheria* irregular green granular masses, often (microscopically speaking) of large size. The granules of which they were composed exhibited active motion, which may have been merely "molecular," but which was accompanied by the protrusion of portions of the mass in a manner which I suppose would be called "amœboid." At first it struck me that it might be amœba itself, but a closer examination quite dispelled that idea. I soon convinced myself that these bodies were portions of the endochrome of the *Vaucheria* escaped from the cell. It appeared that some of them (doubtless those which had escaped longest) had secreted a mem-

brane around themselves. This seemed to put a stop to the motion, though I once saw a flowing movement of the granules after its appearance. I several times saw similar round bodies (I think without a membrane) still within the parent cell. I feel no doubt that these bodies are the same as the "pseudogonidia" described by Naegeli ("vegetable cells," Royal Society, '45, '49), and others in Bryopsis, etc.; but I never remember to have seen any motion in these mentioned. I think it worth recording, as it is singular that the cell-contents should be perfectly motionless in their natural position, but begin to move immediately on becoming free.—*Dukinfield H. Scott, Rooks Nest, Godstone.*

**MICROSCOPICAL MANIPULATION.**—We learn with pleasure that Mr. W. T. Suffolk offers to repeat his lectures on this subject to a class, from members of the Quekett Microscopical Club, at the commencement of the year. We hope that all who are desirous of joining such a class will at once communicate with the Secretary of the Club, so that Mr. Suffolk may have a full attendance when he commences.

**MONTHLY MICROSCOPICAL JOURNAL.**—This journal has just completed its second volume of three hundred and forty pages and contains a mass of microscopical information; lists of new books published at home and abroad; notes of the most recent observations, improvements, and inventions; papers on the stirring topics of the day with which the microscope is associated; reports of the meetings of microscopical societies, and altogether forms a thorough digest of all microscopical matters during the six months, and certainly at a most reasonable price. Those of our readers who may not already have tested its value should do so at once.

**CHEAP FOREIGN OBJECTIVES.**—It is alleged that a young optician named Gundlach, of Berlin, has succeeded in making object-glasses which are cheaper and more powerful than those of Hartnack and other opticians. His No. 7 is better than Hartnack's No. 9 or No. 10, at less than half the price of the No. 9. It has higher magnifying power, more light, and greater focal distance. Max Schültze says that Gundlach's No. 8 is better than Hartnack's No. 14, and is only a third of the price.—*Monthly Microscopical Journal.*

**PLUMULES OF LEPIDOPTERA.**—Mr. John Watson's "further remarks on the plumules or battledre-scales of some of the lepidoptera" appeared in the *Monthly Microscopical Journal* for December, illustrated by three plates with figures of the plumules of seventeen species.



## NOTES AND QUERIES.

ADMIRAL OR ADMIRABLE.—In your answer to your correspondent "M. M. S.," on the meaning of the word admiral, I would say that if he refers to the "Penny Cyclopædia" he will find that "it is a corruption of the Arabic *amir* or *emir*, a lord or chief, the 'al' being only the definite article *the*. Eutychus, Patriarch of Alexandria in the 10th century, calls the Caliph Omar *Amirol Mumenim*, which he translates *Imperator Fidelium* (Commander of the Faithful). Milton writes—

'The mast  
Of some great ammiral.'

'The French write *amiral*—Italians, *ammiraglio*. The 'd' seems to have got into the English word from a notion that admiral was an abridgment of *admirable*. The Latin writers of the middle ages sometimes, apparently from this conceit, style the commander of a fleet *admirabilis* and *admiratus*.'—*C. S. B. G., Eaglesbush, Neath*.

POTATOES.—In Goldsmith's "Citizen of the World," letter cxxiii., the Chinaman, Honan, writes, "From Pangrace (Pancras) to Kentish Town, the road lies through a fine champaign country, well watered with beautiful drains, and enamelled with flowers of all kinds." Subsequently he says, "Perceiving night approach, I made a hasty repast on roasted mutton and a certain dried fruit called potatoes." Can any of the readers of SCIENCE-GOSSIP furnish additional information respecting the preparation of this dried fruit?—*R. T., M.A.*

"HODDY-DODDY" (vol. iv., pp. 140 and 164).—Wright's "Dictionary of Obsolete Provincial English" (Bohn's series) gives the following:—Doddy, small, *East*; Doddy-pate, blockhead: hoddy-doddy, hoddy-pette, hoddy-poule, a weak, foolish fellow; and again, hoddy-doddy (1) sub., a revolving light, *Devon*; (2) adj., disproportionably stout. This is all the information I have been able to extract from dictionaries. Possibly *doddy* may be connected with *dowdy*, and *hoddy* with *hode*, i.e. hood. There is a good passage in Latimer's Seven Sermons, before Edward VI. (p. 84, Arber's Reprint), "What, ye brainsycke fooles, ye hoddy-peckes, ye dodye-poules, ye huddes, do ye beleve hym? are you seduced also?" I may remark that the epithet I have heard bestowed upon the snail is "Horny dorney," and a similar doggerel to that given with "hoddy-doddy" tacked on, which has escaped my memory.—*R. T., M.A.*

THE SACRIFICIAL STONE.—The habit of black-birds and thrushes resorting to a good-sized stone to crack the shells of snails upon, has often appeared to me noteworthy and interesting: a fact, though perhaps well known to naturalists and dwellers in the country, may be new and curious to town-folks. Many a time, by a hedge-side or a retired nook in a green lane, have I heard the tap, tap, of the operators at work, and, on walking up to the anvil of this hammering, have been surprised to see the number of broken pieces of shattered shells that lay scattered about it! Surely this act of the birds partakes more of reason than instinct, suggesting the question, Could we do more?—*W. B., Fowey*.

AN ODD PLACE FOR A HUMBLE-BEE'S NEST.—Our country butcher being for a long time annoyed in his shop with humble-bees, was at a loss to find

out where they all came from. His shop is a wooden erection, having a broad running beam at the top of the wall to support the roof. The windows are open in summer and the aperture covered with hexagon wire netting. On carefully searching the premises, he discovered on the top of this beam, at the foot of a rafter, a thriving colony of humble-bees, snugly ensconced among the wool in a *sheep's tail* which he had cut off and thrown there some time in the spring. At my request the butcher promised to preserve it, but unfortunately when I next went to see it, I learned that some rats had found it out and destroyed it.—*R. D. Cruden*.

OTTER IN OXFORDSHIRE.—I again copy a paragraph from the *Oxford Chronicle* of to-day:—"A fine male otter was captured on Tuesday night in the stream at the bottom of the Earl of Abingdon's wood, near Wytham. Length from tip of nose to extremity of tail, four feet two inches, and weighed nearly twenty-three pounds. Otters are now very rare in this neighbourhood."—*Henry Ward*.

"BEES DESERTING."—In answer to your correspondent, Mr. William Balchin, I wish to state that I have had this year a second swarm of bees that returned to the old stock after having had possession of a hive twenty-one days, and making four nice combs, six or eight inches diameter. I may also add that the second swarm appeared sixteen days after the first one, which is very unusual, as they generally leave about the ninth day.—*E. Seville*.

LIGURIAN BEES.—In reference to the interesting may state (as an old bee-keeper), that if the remarks of "W. A. E." in your December number, I Ligurian bees "provide *themselves* better," it follows as a matter of course that they produce more honey for the bee-master. It has been well said that "the Ligurian bees collect four times as much honey as they require for their winter's consumption, thus giving as it were three-fourths of their labour to their landlord for the rent of their habitation." It is, I believe, generally admitted that Ligurian bees are more prolific, send out more labourers into the field (which is of great importance, considering the short honey season we enjoy in this country), and they are able to fill supers in much less time than our common black bee. "W. A. E." states his Ligurian swarm was put into the hive on the "2nd of June," and that they "increased most rapidly," but he does not favour us with the date when he admitted the bees to the five glass supers, or when they were taken away. Neither does he give the date when he "added a box which was filled immediately with bees." Dates are of much importance in such matters. When I resided in Suffolk I found it useless to allow supers to remain on the hive after the 10th of July, but I find the bees will work a month later in Kent. It should also be taken into consideration that the season just past has generally been very unfavourable for honey-getting,—the worst I have ever known since 1860,—that even my Ligurian bees (of which I have upwards of twenty stocks) have failed to provide a sufficiency for themselves without a large amount of artificial feeding.—*Kentish Bee-keeper*.

TO PRESERVE CRUSTACEA.—I shall feel obliged to any one for information as to the best method of preserving and mounting crustacea, especially the stalk-eyed, for the cabinet, or where I shall find the necessary instructions.—*W. S.*



"THE ANIMAL WORLD."—We heartily commend the reasons which prompted the Royal Society for the Prevention of Cruelty to Animals to start this little journal, which they designate "The Animal World." The Illustrations are good, and the matter keeps the main object in view. Any mode of inculcating better relations between man and the lower animals always enlists our sympathy, and we believe, also, that of our readers.

DIATOMS TO THE RESCUE.—A brother "diatomaniac" has called my attention to some strictures copied from *Scientific Opinion*, and reiterated by "MacLeod, of Skye." Before making any attempt to excuse ourselves for studying these singular forms (relations of his favourite micro-fungi) may I be permitted to ask "MacLeod, of Skye," to explain his second paragraph. I cannot understand how the possession of a rare object can be a miserly or selfish passion; perhaps he will favour the readers of SCIENCE-GOSSIP with a figure of a selfish passion. If any reader of this possesses a rare object—be it a picture by Raphael, a book by Caxton, a silver penny of Alfred, a British specimen of *Lycæna dispar*, or, still worse, one of Dr. Greville's rare forms of *Diatomaceæ*, let him at once destroy it—it is unworthy the lowest intellect. I am also at a loss to understand how the second sentence in the same paragraph, viz., "Nature works for the benefit of the whole human race (? only), and showers her benefits upon all." How then is a rare object a selfish passion? or how is a selfish passion a benefit? But perhaps if I give up diatoms and study micro-fungi, or, better still, read "my paper" on "Vaccination versus Nature," I shall be able to comprehend these mysteries. "MacLeod, of Skye," leads us to infer that the micro-fungi are the causes of disease. This is more than doubtful. Fungoid growths are much more likely to be the effects rather than the causes of disease; whenever decomposition takes place the lower forms of vegetable life soon appear, thus utilizing what would otherwise be waste and noxious matter. There is a universal tendency to decay in all organized matter, that is to say, constant endeavour of the component atoms to assume new forms; this is only prevented by vital force, and when vitality is weakened by age, sickness, or want of nourishment, decay gets the mastery, and a favourable soil is developed for the growth of parasitic fungi. I saw a few years since, I think in a paper by a German physician, a statement that *Palmella cruenta* was the cause of ague, and that where it was plentiful ague was prevalent. The writer seems to have forgotten that *P. cruenta* only grew in damp situations, and the conditions favourable to its growth were also favourable to the development of ague; therefore, with all due respect to "MacLeod, of Skye," I do not think that the study of micro-fungi in place of diatomaceæ will much alleviate the pangs of "suffering humanity." The mere collector of diatoms or any other objects of natural history is not much more worthy the name of naturalist than a postage-stamp collector is, but surely those singular forms of plant-life known as Diatomaceæ are as much worthy of study as any other class of minute animal or vegetable life. I can assure "MacLeod, of Skye" and others that the life-history of a diatom is as full of interest and as marvellous as that of a fungus or the hair of a plant. If they imagine that the student of diatoms occupies all his time in the resolution of striæ they are much mistaken; it is desirable to be able to ascertain the character of the markings,

as they sometimes indicate the affinities of species, but when once understood he does not think it necessary to make a show object of them. One word in conclusion,—by all means let "MacLeod, of Skye" pursue his favourite studies, and give the readers of SCIENCE-GOSSIP the benefit of them, and leave off abusing others who may pursue a different branch of natural history, is the humble advice of *Kitton, of Norwich*.

BUTTERFLIES AT SAP.—I have often noticed the great attraction that any exuding of sap has for *Atalanta*, very especially on oaks. I have seen no the most unattractive slime of decaying wood a thick cluster of *Atalanta* eagerly sucking the juice, and so forgetful of danger that I could easily take them, off by hand. Flies and earwigs accompany them and moths at night, but I do not remember ever to have seen any other butterfly attracted, not even of the *Vanessidæ*.—*W. D. R.*

CRANESBILLS.—I am afraid Mrs. Watney has been exercising her imagination again, when she says that the styles of Geranium "act like a screw in fixing the seed into some chink or crevice where it may happen to rest." My own experience shows that in the genus Geranium, when the seed is ripe, the pericarp splits along its inner edge, and presently the style (becoming dry and hard by the action of the sun) is suddenly recurved with a force sufficient to jerk the seed out of its pericarp; but the style itself, with the empty pericarp, remains, attached by its apex to the top of the central column; consequently Mrs. Watney's idea must be incorrect. In *Erodium* and *Pelargonium* the case is very different. In these genera, the carpel becomes wholly detached from the axis, and also becomes spirally twisted, the seed being still closely retained by the pericarp; the style, too, is beautifully bearded on its inner side with long silky hairs; these are at first closely adpressed, but when the style is spirally twisted, they (as a natural consequence) stand out in all directions. I believe (though I cannot say for certain) that these hairs serve the same purpose as the pappus of Composites, causing the seeds to be dispersed by the wind. This I conceive to be the real object for which the styles are so curiously twisted, namely to make the said hairs available for the useful purpose for which they are intended. The idea is made more probable by the fact that in Geranium (where the seeds are sown in a very different manner, as already explained) the hairs are absent, the styles being glabrous internally. Your correspondent, T. Williams, has given another reason for the twisting of the carpels, affirming that they "twist themselves into the soil." I have no reason to doubt this statement, but cannot confirm it, as I have carefully watched seeds laid on earth for several days without any result; but perhaps a longer time would be necessary. I mean, however, to renew my experiments next season in hopes of arriving at the truth.—*F. Evershed, Shere, near Guildford*.

DEAN BUCKLAND'S GEOLOGY.—Whether or not we believe that the Bridgewater Treatises have done their work, and should be allowed to rest, is beyond the question in this instance, and we accept the publication of a fourth edition of the Dean's Geological Treatise with gratitude and respect. These two volumes of Bohn's Scientific Library, now published by Bell & Daldy, are edited by that energetic and irrepressible naturalist, the Dean's son, Mr. Frank Buckland, and we doubt not will



find in their present form many new readers. The first volume contains the letter-press, and the second the atlas of plates. Enough has already been written of the respective merits of these treatises, and we doubt whether any one of them deserves to be better known than that which we now commend to the notice of our readers. The full title is—"Geology and Mineralogy, as exhibiting the Power, Wisdom, and Goodness of God, by the Very Rev. W. Buckland, D.D., F.R.S.; with additions by Professor Owen, Professor Phillips, and Robert Hunt. Fourth edition, edited by Francis T. Buckland, M.A. In 2 vols. London: Bell & Daldy. 1869."

**RIBS OF THE DUN COW.**—It would be interesting to ascertain how many of these so-called ribs exist, and also what led to their being placed in churches. There is one in the fine old church of Chesterfield, in this county, so famous for its crooked or leaning spire: there is I believe one or more at Warwick. It is singular that these, as well as St. Mary's, Bristol, are all connected by tradition with the fabulous story of Guy of Warwick. The rib above named is in the Foljambe chapel, and is placed near to the effigy of an unknown knight, whose marble figure is represented in a suit of armour in the attitude of prayer; he is kneeling on a richly embroidered cushion, and resting on the altar tomb on which he is placed is the large bone; it measures on the outside 7 feet 4 inches, and is from 12 to 13 inches in circumference. Local tradition has given the name of Guy, Earl of Warwick, to the knight. The man who took me through the church said, this is Guy who slew the Dun Cow, it was during a period of great scarcity, and the flesh of the cow was eaten by the people who would otherwise have perished in the famine. Another legend is, that the cow had been driven mad by the over-milking of a witch, and was killed by Guy, and its bones sent to various places as a memento of his victory. These bones are thought by some to be those of small or young whales, or of some other marine animal; and this idea is favoured by that at Chesterfield having the name of Thomas Fletcher deeply cut into it in old English characters, from which it is inferred that he placed it in the church. This would be about the year 1650, when the influential family of Foljambe having all passed away, they were succeeded by one having the above name; and being wealthy, one of them would no doubt have travelled, and he may have brought this bone as one of his trophies, perhaps the others may be accounted for in the same way. I have no doubt a satisfactory solution will be found for the difficulty by some of your readers, who may also be able to state how it was that the story of Guy of Warwick came to be associated with the bones. Whales' bones were formerly much thought of in country places, and are very often seen set up in gardens or forming an entrance arch to some well-to-do village-house or farmyard.—*G. B.*

**ST. MARY'S REDCLIFF, BRISTOL.**—Your correspondent, "H. N.," describes a large bone which he saw placed on the capital of one of the pillars of this grand old church, and he mentions a tradition which he was informed was attached to it, viz., that the bone was said to be the rib of a dun cow which supplied the city of Bristol with milk. I never heard *this* account of the relic, but in 1834, when I officiated as organist at Redcliff church, I of course often saw this "old bone," and very near it was

suspended a dirty-looking picture, representing a fierce-looking dun cow. The tradition which at *that* time was narrated to visitors by the sexton of the church, stated the bone to have been "one of the ribs of the famous dun cow which was slain by Guy, Earl of Wavick, and that the picture close by it represented the terrible animal." I had not been inside the time-honoured pile from the year 1836 until about three years ago, when, in passing through Bristol I paid a brief visit to the scene of my first agreeable labours as organist, and there I found the "old bone" just where I first saw it in 1834. I have been informed that a similar bone is preserved in Warwick Castle, and the same tradition is attached to it. Visitors there are also shown a wonderful cup which holds several gallons, the custodian gravely informing the public that "Guy, Earl of Warwick, emptied this cup every morning at his breakfast."—*W. H. Grattann, Exmouth.*

**PRESERVING FOSSILS.**—Will any of your readers inform me what is the best process to employ for preserving fossils? I procured many very good specimens of leaves from the cliffs at Bournemouth a few months ago, and I wish to preserve them, as they are in such very good condition.—*S. J. B., Moseley, Birmingham.*

**THE CAT.**—The interesting papers that appeared lately referring to the cat have led me to send you a few remarks on this animal. The most interesting of my experiments are those connected with electricity. When I have taken the usual means of ascertaining its presence I have frequently not attained to the desired result, while on other occasions a result which may be classed among modifications of the 2nd class of ordinary disruptive discharges has been reached. The first owing to the cats being old; the second, because members of the family Felidæ are, like all electric bodies, much influenced by the weather—a sharp frosty day finding them highly productive, while in wet or damp the reverse is the case, which of course would influence the first instance also. No animal is capable of distinguishing with greater acuteness between friends and foes than a cat. I say this advisedly, not even excepting dogs. A cat will often understand words alone with marked keenness. The principal complaints from which puss suffers manifest themselves by 1st, listlessness, a rough coat, and sometimes sullenness; 2nd, holding one ear depressed (which, however, is common to the first and third classes), thirst, want of appetite, and increased roughness of coat; 3rd, sickness, running at the eyes and nose. These are among the most common complaints, all of which puss and nature can better remedy than we can. The extreme shyness of this little creature's disposition, for it often appears more at home than it is, makes it difficult to teach it such tricks as many dogs learn, though many cats will "shake hands" at pleasure. One of mine is in the habit of leaping on to my shoulder at dinner, and at first used to waylay morsels on their transit to my mouth, but as even I, although she met with great indulgence as a rule, objected to this, puss now waits serenely in this position for her turn.—*W. H. S. Beaufort, B.A.*

**ACHYLA PROLIFERA.**—It will take some little time to prepare a bibliography of this plant and its allies, but we will endeavour to furnish our querist with one shortly. The most complete recent contribution on the subject appeared in Pringsheim's *Jahrbücher*—we think by Dr. de Bary.



## NOTICES TO CORRESPONDENTS.

ALL communications relative to advertisements, post-office orders, and orders for the supply of this Journal, should be addressed to the PUBLISHER. All contributions, books, and pamphlets for the EDITOR should be sent to 192, Piccadilly, London, W. To avoid disappointment, contributions should not be received later than the 15th of each month. *No notice whatever can be taken of communications which do not contain the name and address of the writer*, not necessarily for publication, if desired to be withheld. We do not undertake to answer any queries not specially connected with Natural History, in accordance with our acceptance of that term; nor can we answer queries which might be solved by the correspondent by an appeal to any elementary book on the subject. We are always prepared to accept queries of a critical nature, and to publish the replies, provided *some* of our readers, besides the querist, are likely to be interested in them. We do not undertake to return rejected manuscripts unless sufficient stamps are enclosed to cover the return postage. Neither can we promise to refer to or return any manuscript after one month from the date of its receipt. All microscopical drawings intended for publication should have annexed thereto the powers employed, or the extent of enlargement, indicated in diameters (thus:  $\times 320$  diameters). Communications intended for publication should be written on one side of the paper only, and all scientific names, and names of places and individuals, should be as legible as possible. Wherever scientific names or technicalities are employed, it is hoped that the common names will accompany them. Lists or tables are inadmissible under any circumstances. Those of the popular names of British plants and animals are retained and registered for publication when sufficiently complete for that purpose, in whatever form may then be decided upon. ADDRESS No. 192, PICCADILLY, LONDON, W.

B. T.—We cannot, under any circumstances, insert books or requisitions for books in the "Exchange" column. Apply to Mr. Wheldon, Bookseller, Great Queen Street, W.C.

A. I.—It was probably the young of the black variety of the adder. We could not determine from rough description.

J. W.—One is the "Mealy Guelder Rose," and the other the common "Cornel," but no numbers were attached.

F. G. might generally obtain what he wants in that line by sending a stamped envelope to the Editor of SCIENCE-GOSSIP.

CALIGRAPHY.—If our correspondents will not take the trouble to write their "Exchange" notices distinctly and legibly, especially names and addresses, we cannot insert them.

F. W. MARRAT, 32, Empire Street, West Derby Road, Liverpool, and *not* Kensington, as previously given in Exchange column.

W. E. P.—We do not see that your note adds any information on either word, and is merely curious.

J. H. M.—Only by exchange. Consult our Exchange notices, as "sections of wood" were lately offered.

A. J.—Too long to insert entire, as you will see by a reference to past numbers and notices.

R. L.—Every entomologist knows that *Gonepteryx rhamni* appears erratically in all sorts of wintry weather.

NAME LABELS, W. F. H.—Our readers will observe the advertisement in the December number of your printed name labels for slides.

C. B. R. will find an advertisement of the "Birds of Somersetshire" in the last number of SCIENCE-GOSSIP, at p. cliii. "The Birds of Sherwood Forest," by W. J. Sterland (Reeve).

W. G. M.—For mounting crystals see SCIENCE-GOSSIP for 1866, pp. 19, 33, 135. For cutting Echinus spines see "Davies on Mounting," pp. 99.

G. B.—We insert no notices of exchanges in which books are included.

ERRATUM.—At page 273 of our last number, top of second column; 600 is printed instead of 60.

R. D. may obtain "Ligurian Bees" from Mr. Pettitt of Dover.

E. M. H. is too late, being a "day after the fair."

J. C. G.—We know of no such a book.

A. P.—Eighteen-pence (Van Voorst).

J. C. D.—The fern is *Asplenium adiantum-nigrum*.

W. L. W. E.—At present uncertain. The *Hepaticæ* are in preparation, and will follow the flowering plants. It depends very much on the success of this, whether the mosses are also published.

J. M.—Entirely foreign to our "Exchange" column, and can only be inserted as an advertisement.

R. T. A.—Probably there has been some mistake, and "Hereford" may have been read for "Hertford"—illegible writing therefore incurs the blame. This would exonerate "R. T. A." from any wilful attempt to mislead us or our correspondents; still, if we insert "exchanges" gratuitously, we claim the right to exercise supervision. In the conviction that carelessness on the part of some one led to the insertion of the notice in our last issue, we exonerate "R. T. A." from any charge of unfairness, and can only hope that he will accept our expression of regret that any suspicion should have attached to him.

## EXCHANGES.

BRITISH BIRDS' EGGS, and Land and Fresh-water Shells, in exchange for others.—W. S. Willes, 31, Charlotte Street, Aberdeen.

CYCLAS OVALIS.—Send box and postage, or other shells to F. R. Stephenson, Salterhebble, Halifax.

RARE BRITISH MOSSES.—Exchange lists with A. Jerdon, Highfield, Melrose, N.B.

L. DISPAR.—Eggs by sending box and postage stamps to J. Purdue, Ridgeway, Plympton, Devon.

BIRDS' FEATHERS, Sections of Vegetable Ivory (mounted) for other good mounted objects.—Capt. Cox, 152, Holland Road, Kensington, W.

HAIRS OF MOLE.—Fiji, native cloth, leaves of *Araucaria imbricata*. Send stamp and directed envelope to Isaac Wheatley, Malling Street, Lewes (any microscopic object acceptable).

INJECTIONS, for Colcoptera, or other good mounted objects of interest.—G. C. Gowan, 20, Beauchamp Square, Leamington.

ERYTHRÆA PULCHELLA, *littoralis*, *latifolia*, and *Scirpus holoschænus*, for other rare British Plants.—H. S. Fisher, 17, Hemans Street, Toxteth Park, Liverpool.

FOSSILS from the Coal, Mountain Limestone, Muschelkalk, and Lithographic Slate, for Devonian, Permian, Gault, or Greensand Fossils.—F. T. Mott, 1, De Montford Street, Leicester.

RHOPALOCERA offered for other Butterflies or Moths.—A. T. Michell, Magdalen Hall, Oxford.

TWENTY-FIVE SPECIES of British Birds' Eggs, two specimens each, for good British Shells.—H. J. Palethorpe, 32, Milton Place, Halifax.

## BOOKS RECEIVED.

"The Development of the Idea of Chemical Composition," by Alexander Crum Brown, M.D., D.Sc. Edinburgh. Edmonston & Douglas.

"Scientific Opinion." Part XIII. December, 1869. London: Wyman & Sons.

"Geology and Mineralogy, as exhibiting the Power, Wisdom, and Goodness of God," by the Very Rev. W. Buckland, D.D., F.R.S. 4th edition, edited by Francis T. Buckland, M.A. In two vols. London: Bell & Daldy.

"The Chemical News." Nos. 520, 521.

"The Academy." No. 2, November 13, 1869.

"Land and Water." Nos. 201, 202, 203, 204, 205.

"The Monthly Microscopical Journal." No. 11. December, 1869. London: Robert Hardwicke.

"Le Naturaliste Canadien." No. 12. November, 1869.

"The Canadian Entomologist." Vol. II. No. 3.

"The American Entomologist." Vol. II. No. 2. November, 1869.

"The Dental Register." November, 1869. Cincinnati: Wrightson & Co.

"The American Naturalist." December, 1869. Salem: Peabody Academy of Science.

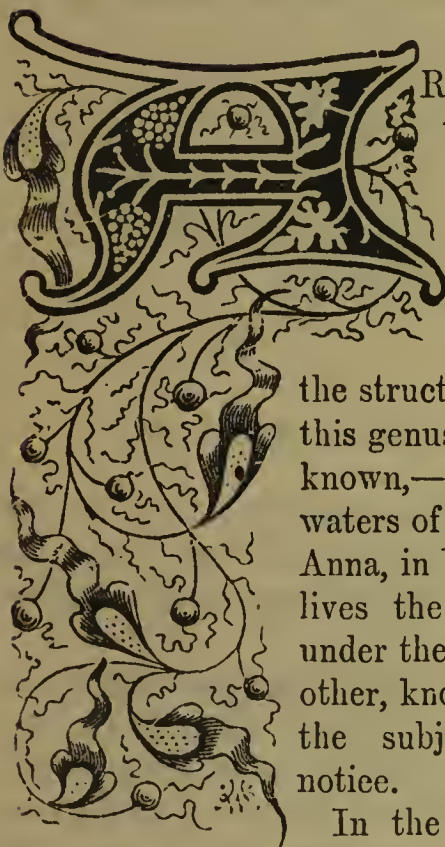
COMMUNICATIONS RECEIVED.—A. I.—Dr. P.—F. W. M.—A. H.—W. S. W.—T. G.—F. E.—B. T.—H. E. W.—W. H. G.—J. H. M.—A. J.—R. W.—W. W. S. B.—W. H.—J. R. S. C.—R. L.—W. E. P.—W. P.—J. A.—R. H. M.—W. G. M.—C. B. R.—D. H. S.—S. A. S.—W. S.—W. H. S.—W. F. H.—W. C. A.—E. S.—C. S. B. G.—R. T.—H. W.—E. H.—S. J. B.—W. A. V.—R. D. C.—G. B.—G. C. G.—R. T. M. A.—J. M.—J. C. D.—J. C. G.—J. V.—T. W.—J. S.—T. S.—G. B.—W. L. L.—E. M. H.—F. J. W.—W. J. P.—I. W.—W. B. F.—H. W. C.—J. P.—E. H.—W. L. W. E.—W. F. H.—H. S. F.—A. T. M.—R. H. M.—J. M.—H. J. P.—F. T. M.—J. S.





## THE VOLCANO-FISH.

BY THE REV. W. W. SPICER, M.A.



ARGES is the name given to a genus of fishes belonging to the family of the *Silurids*, nearly related to *Pimelodes* of Lacepède, but separated on account of the structure of the teeth. Of this genus but two species are known,—one found in the fresh waters of the Mission of Santa Anna, in Upper Peru, where it lives the ordinary piscine life under the name of Sabalo; the other, known as Pregnadilla, is the subject of the present notice.

In the year 1803, A. von Humboldt was fortunate enough to witness an eruption of Monte Cotopaxi, a well-known peak in the Northern Andes; during which, among other products, a large quantity of fish was ejected. The inquiries immediately instituted, and the investigations of more recent travellers, have brought to light the astounding fact, that from time to time, though at irregular periods, fishes are cast up from the interior of the mountain during volcanic eruptions. This phenomenon is not confined to Cotopaxi; it has been observed also in other centres of volcanic action—to wit, Tungurahua, Sungay, Imbaburu, Cargueirago, &c., all of them in the same range. From the craters of these volcanoes, or from fissures in their sides, it is an ascertained fact that fish are vomited forth at an height of some 16,000 feet above the level of the sea, and about half that height above the surrounding plains. The animals all belong to a single species, the *Arges Cyclopus*, as it has been well named. Nor is it a mere chance fish or two that finds its way to the outer world through this

strange opening. They are ejected in such countless shoals that, on more than one occasion, the fetid exhalations proceeding from their putrid bodies have spread disease and death over the neighbouring regions. Such was the case in 1691, when the volcano of Imbaburu vomited myriads of these fish over the town of Ibara and its environs: on this occasion pestilential fevers desolated the neighbourhood. The same occurred when the summit of the volcano of Cargueirago fell in (June 10, 1698), and millions of Pregnadillas were thrown out of the sides of the mountain, mingled with mud and clay. At a later period the lands of a certain Marquis de Salvalegoe were completely covered with these fish, the infectious odour from whose decaying bodies poisoned the surrounding country.

As far as the external world is concerned, *Arges Cyclopus* is known to exist in some lakes on the sides of these mountains 8,000 to 10,000 feet above the sea-level. It is presumable that these lakes communicate with reservoirs in the interior, where the Pregnadillas are generated, and thus find their way through the crater. But this is mere conjecture. Nor, after all, does it help much towards removing the difficulties by which the phenomenon is surrounded. If these supposed lakes do exist in the interior of the mountain, how strange must be their situation, which allows of fish living in them at an ordinary temperature, and yet places these same fish exactly "in the line of fire" when the contents of this huge earth-stomach are discharged by the crater's mouth!

If the internal lakes do not exist, whence come the myriads of fish which are ever and anon ejected?

Not the least curious part of the affair is, that though some of the fish reach *terra firma* in a half-boiled condition, most of them are perfectly raw, and not a few are even alive, in spite of the fiery ordeal through which they have had to pass.

Havre.



### PIGMY CRUSTACEANS.

THERE are two small species of the curious family of Pycnogonidæ, which I find in tolerable abundance on this coast, and as they belong to a class of creatures to which very little attention appears to be paid by microscopists generally, I propose to jot down a few particulars which I have been able to glean respecting them, in the hope that they may interest some of the readers of SCIENCE-GOSSIP, and possibly induce some other seaside naturalists to look up the anatomy and life-history of this obscure but very singular group of crustaceans.

The information to be obtained from books respecting the natural history of the *Pycnogonidæ* is, so far as my experience goes, very limited. Most popular writers either pass them over without notice, or are content with a very casual mention of them, and I have not yet been able to learn that there is any full and exhaustive account of them extant. The best account of their anatomy which I know of is that contained in Dr. Carpenter's "Microscope and its Revelations," 4th edit., pp. 636-638.

Cuvier classed the Pycnogons among the *Tracheurian arachnidæ*, the order to which the mites, ticks, and chelifers belong—a classification which is, I believe, now admitted by the best authorities to be erroneous. They are considered to be true crustaceans, but exhibit a singular degradation of type, the digestive and circulatory organs being reduced to a very rudimentary form.

The two species which are the subject of the present paper are the *Achelia hispidata* and *Pallene pygmæa* of Hodge. They both inhabit rock-pools, between tide-marks, and seem especially to affect the bushy tufts of *Corallina officinalis*, which are the favourite haunts of so many forms of microscopic life. A pickle-bottle full of this weed brought home for examination at leisure, has generally rewarded me, on careful search, with a score or more of specimens, which, on being placed in a tumbler of sea-water, with a few fronds of coralline, soon make themselves at home, and may be kept alive and healthy for months with very little trouble. For microscopic purposes I find them improve by keeping, as they get rid of the coating of diatoms and other extraneous matters which, when freshly caught, frequently obscures the satisfactory view of their internal arrangements.

I have before me, in the zoophyte trough, while writing, a group of some half-dozen individuals of the two species named. With a two-inch objective and the dark-field illumination, a very good idea of their general form and structure may be obtained. At first sight they might almost be taken for diminutive specimens of some of the long-legged spider-crabs, *Inachus* or *Stenorhynchus*, to which genera,

in 'their' sprawling gait and gaunt skeleton-like aspect, they bear not a little resemblance. They sprawl leisurely over the weed, to which they cling very tenaciously by means of their powerful hooked claws; and when, as is often the case, two or three individuals come into contact, the long legs get mixed up into a state of most admirable confusion. Two or three of the specimens before me have attached to the under side of the thorax one or two roundish masses of spawn. These are carried in a sort of loop formed by a pair of false feet, with which the females are provided, but which are entirely wanting in the males. The spawn is carried until hatched, after which the larvæ appear to reside on the body of the parent for some time, probably until washed off, and compelled to shift for themselves. The newly-hatched young (fig. 33)



Fig. 33. Larva of *Achelia* at birth,  $\times 160$ .

are curious, active little creatures; they are furnished with four bristle feet and a very formidable-looking pair of chelæ, which they use with considerable energy.

It is not uncommon to find females loaded with spawn and young at the same time, and a very curious sight it is, reminding one of the prostrate Gulliver with the citizens of Lilliput climbing over his body. I have not yet been able to trace the development of the larvæ beyond the next stage of their career, I presume after undergoing their first moult. In this state they present the appearance shown in fig. 34. They have increased greatly in size, and though their general form continues the same, show a marked advance towards the perfect state. The pulsations of the stomach can be plainly seen, and the rudiments of the cæcæ of the limbs, to be described presently, also make their appearance. Beneath the thorax is seen the projecting mouth, from which a short gullet passes backwards to the gizzard, and a dark spot on the upper surface of the thorax shows the position of the eyes. In this stage I find them grubbing about among the refuse of decaying weed, excrement of Polyzoa, &c., at the bottom of the vessel in which they are kept; and, from their appearance, they do not starve. There does not appear to be any marked difference between the larva of *Pallene* and *Achelia*: the specimens figured are of the latter.

Let us now glance at the anatomy of the adult Pycnogon, selecting for that purpose a fine specimen of



*Pallene pygmæa* (fig. 35), as exhibiting some peculiar points in a marked degree. Placing it in a shallow cell, so as to keep its limbs extended, a power of 40 or 50 diameters, illuminated by the spot lens or Wenham's paraboloid, will be sufficient to bring out

thorax, the two terminal joints forming a powerful sickle-shaped claw. Projecting upwards from the posterior extremity of the thorax is what looks like a little tail: this is the rudimentary abdomen. At the anterior extremity of the thorax is seen the



Fig. 34. Larva of *Achelia* after first moult,  $\times 200$ .

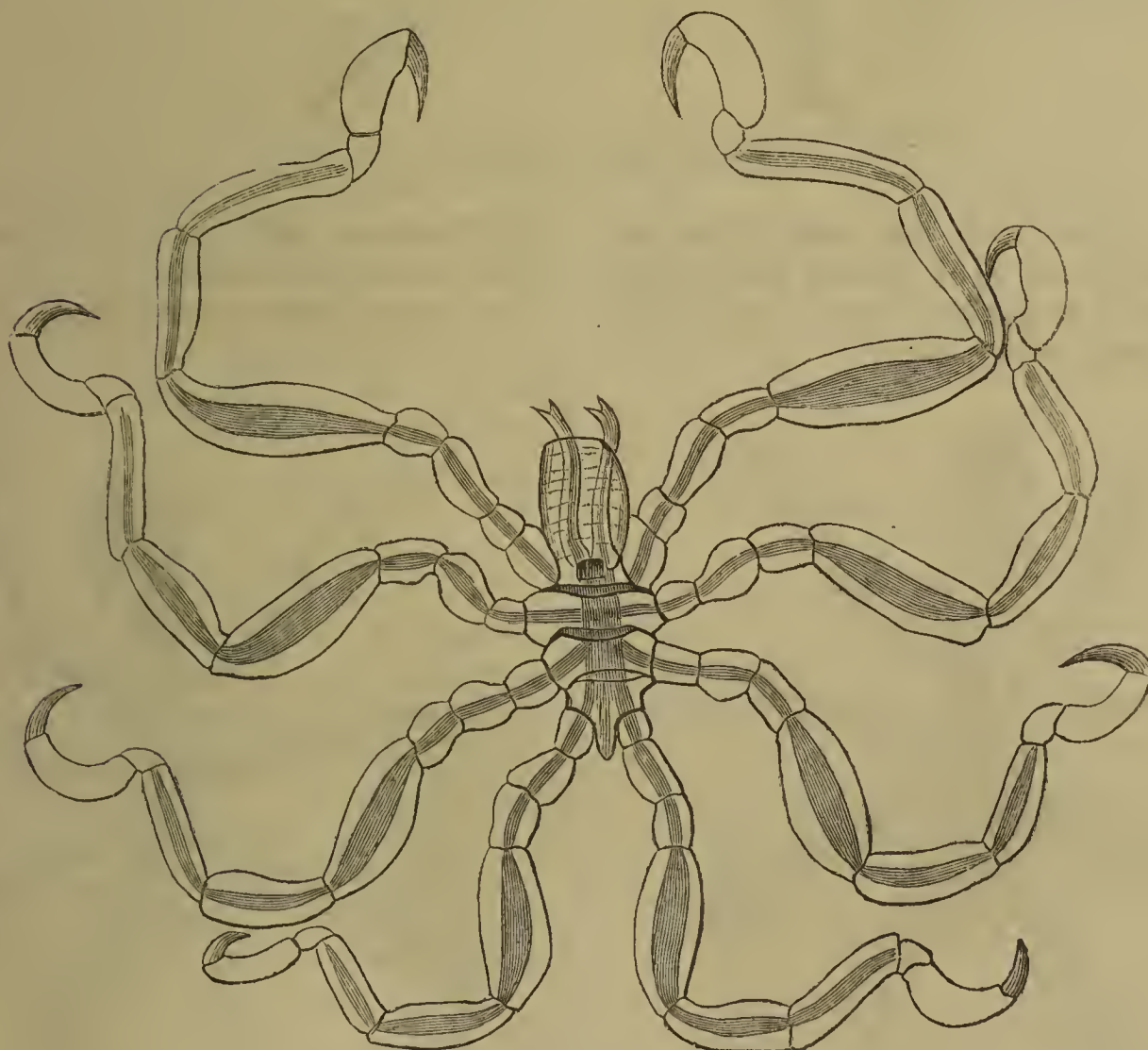


Fig. 35. *Pallene pygmæa*,  $\times 16$ .

the most prominent points of its structure. The thorax (figs. 37 and 38) is narrow, and composed of four segments, or probably five, the two anterior being fused into one. Into each segment is articulated a pair of long and stout legs, each composed of nine or ten joints, and about four times the length of the

head, which is about half its length, somewhat cylindrical in form, and terminated by a triradiate mouth (fig. 41 A), which, according to Dr. Carpenter, is provided with cilia. Viewed from beneath, the head appears to be traversed throughout its length by a sort of suture dividing it into two parallel



portions, and on its upper aspect is a pair of feet-jaws, which are articulated into the front of the thorax. They are armed with chelæ and usually

ing one of the four faces of a turret clock. These ocelli may be well made out with a power of 80 or 90, and are perhaps best seen when viewed in pro-

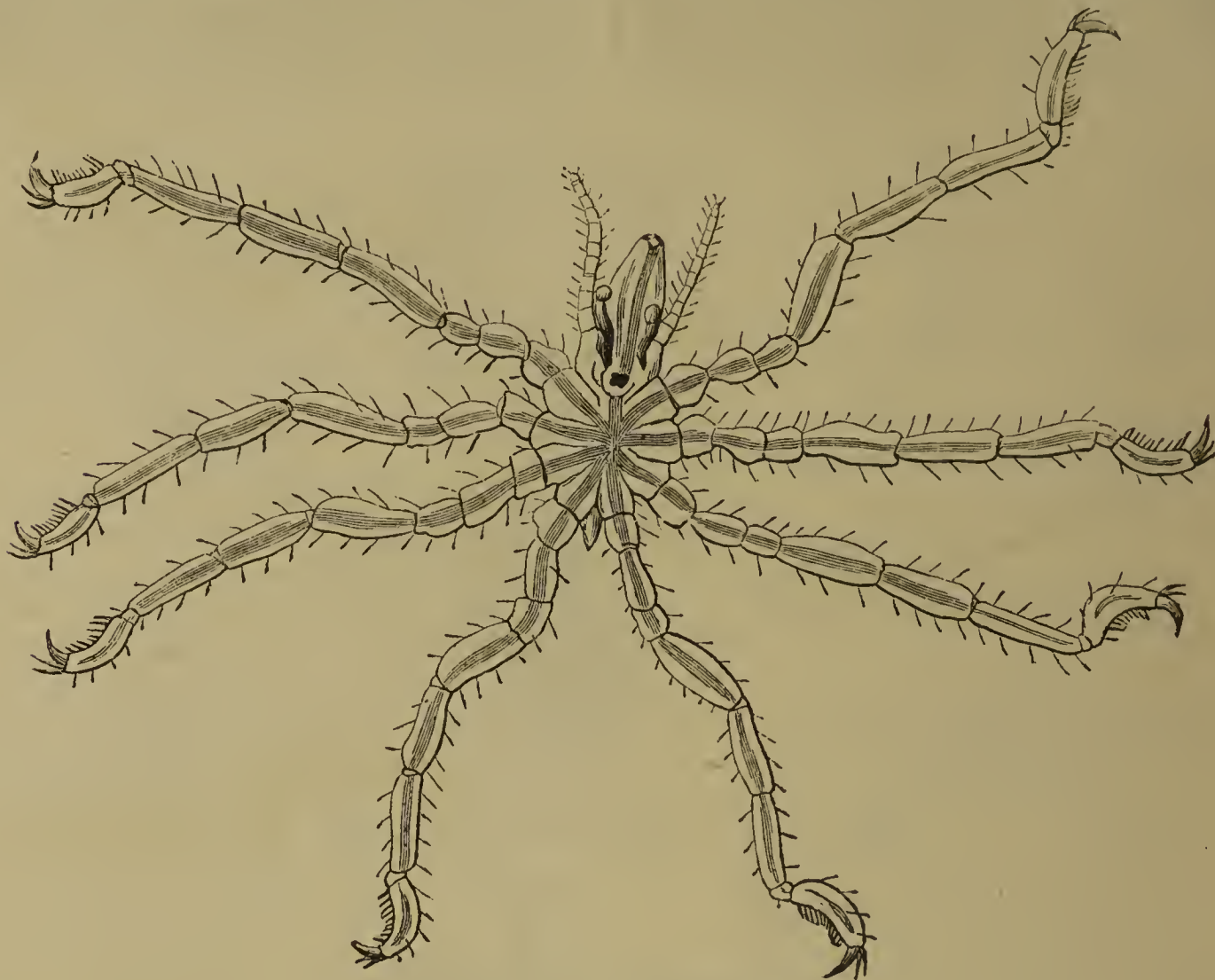


Fig. 36. *Achelia hispidata*,  $\times 16$ .

laid parallel on the head, the chelæ being bent down at right angles, so as to cover the orifice of the mouth when in a state of rest. The antennæ are in this species entirely absent.

file by reflected light, under which they gleam like points of burnished silver.

The trefoil-shaped mouth opens into a narrow

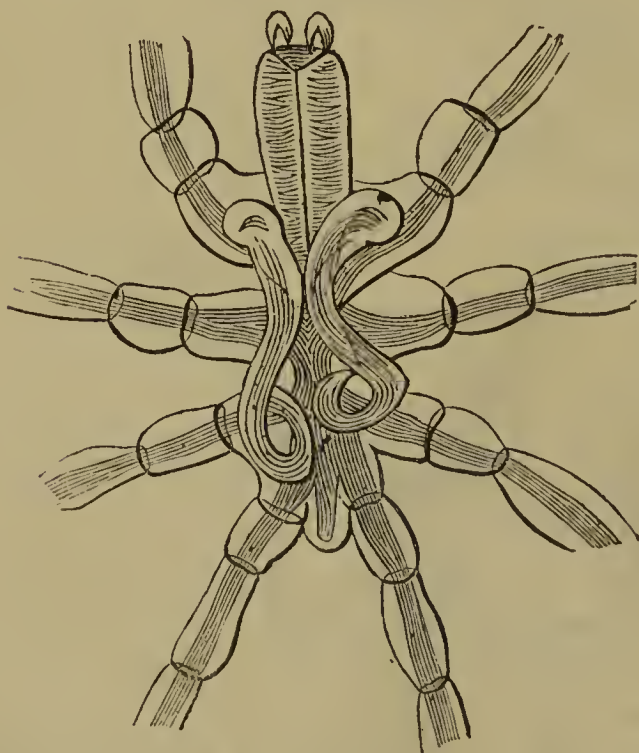


Fig. 37. *Pallene pygmæa*, ventral aspect, showing false feet for attachment of ova,  $\times 30$ .

On the front of the thorax, immediately behind the head, is a little tubercle carrying four simple eyes, set at right angles to each other, and remind-

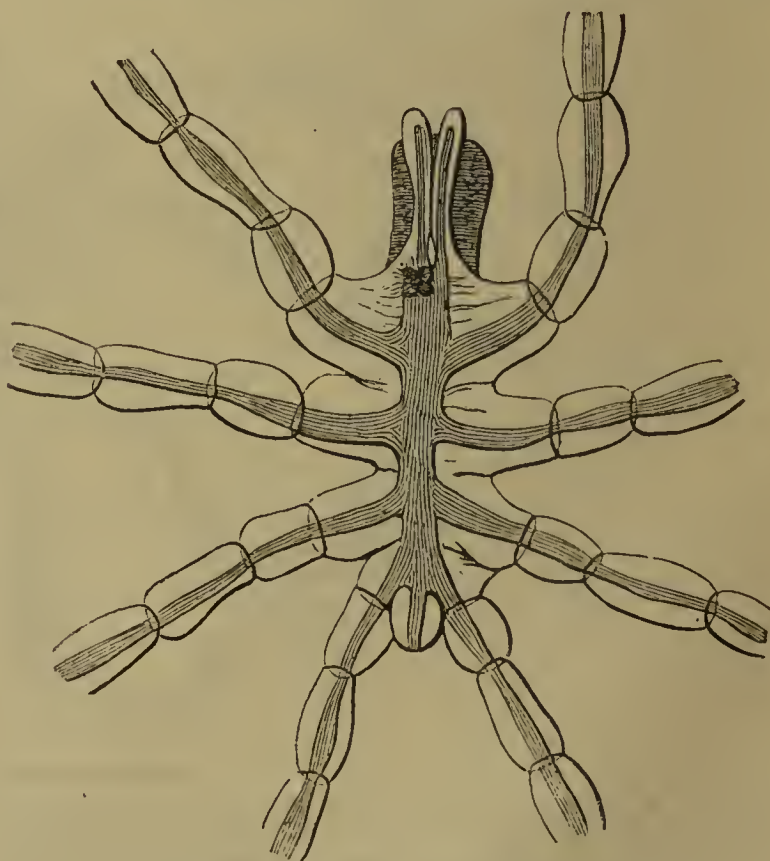


Fig. 38. *Pallene pygmæa*, dorsal aspect,  $\times 30$ .

oesophagus, by which the food is conducted to the gizzard, situate in the posterior part of the head, near its junction with the thorax. This organ



appears to consist of a series of curved plates, overlapping one another and forming a triturating apparatus sufficiently powerful for the soft decaying substances on which the animal subsists. It cannot be well made out in the living subject; maceration in caustic potash, and pressure, being necessary for its exhibition. It opens into the central stomach, which extends the whole length of the thorax, till it terminates in the rudimentary abdomen. In the species before us, it shows as a dark-greenish-coloured sac, occupying the whole median line of the body, with five pairs of branch stomachs or cæcæ proceeding from it into the two feet-jaws, and eight limbs, which latter they traverse as far as the last joint but three. The stomach is an important organ in all creatures from man to monad, but in the pycnogons it assumes a paramount importance, from its performing the functions of a heart in addition to its own proper sphere of usefulness. Both the stomach and its prolongations are seen to contract and expand at somewhat irregular intervals, by which means a periodical ebb and flow of their fluid contents is kept up from the stomach to the cæcæ and back again. The perivisceral spaces between the various stomachs and the walls of the body and limbs are occupied by a colourless fluid with corpuscles, representing the blood; and by the pulsations of the stomachs above described an imperfect system of circulation of this fluid is kept up between the various cavities of the body and limbs. By the expansion of the central stomach, a portion of the fluid occupying the thoracic cavity is propelled into one or more of the limbs, whilst by the corresponding expansion of the cæcæ of the limbs a reflex movement is produced.

There are no branchiæ or special organs of respiration, and the oxygenation of the vital fluid appears to take place through the general surface of the body. The surface of the integument is studded in every part with small warty excrescences, each of which, on careful focussing with a 1-4th objective, is seen to have a central orifice. These are doubtless a sort of simple spiracles, or rather breathing-pores, by means of which the circulatory fluid is sufficiently aërated for the support of the creature's low vitality.

The articulations of the body and limbs are provided with powerful muscles, the action of which in the creature's movements can be well seen, owing to the great transparency of the integument.

Most of the foregoing remarks apply equally to *Achelia hispidata* (fig. 36), which, however, exhibits some well-marked differences in external form. It is smaller and somewhat more compact than *Pallene*, and the limbs are shorter in proportion to the body. The thorax is rounder and more robust, and the head (fig. 41), or, as it would I think be more properly called, the proboscis, is tapered towards its base and apex, giving it a less clumsy appearance than the truncated cylinder of *Pallene*. There are

also a pair of well-developed jointed antennæ, whilst the feet-jaws are very short and terminated by a sort of knob instead of pincers. The large claws have two smaller ones attached to their upper sides



Fig. 39. Claw of *Pallene pygmaea*,  $\times 40$ .

(compare figs. 39 and 40), and the surface of the body and limbs is covered with stiff bristles. In confinement it is somewhat more active than its companion. The female carries her spawn in two masses attached to the false feet beneath the thorax, whilst as far as

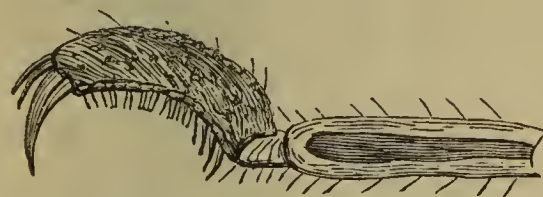


Fig. 40. Claw of *Achelia hispidata*,  $\times 40$ .

my observations go, *Pallene pygmaea* carries it in a single mass. I frequently observe, both in this species and the last, an enlargement of the fourth joints of the legs, between the cæcæ of which and the walls of the limbs are a number of spherical granular bodies resembling ova in different stages.—Query: Have they any connection with the reproductive functions? Possibly some readers of SCIENCE-GOSSIP may be able to elucidate this point.

They do not seem to be peculiar to the females, as I have noticed them in specimens in which the false feet are wanting, and which I therefore presume to be males. They certainly have very much the appearance of ovaries, and I have never observed anything resembling such organs in any other part of the creature.

The nervous system of the Pycnogonidæ, according to Dr. Carpenter, “consists of a single ganglion in the head (formed by the coalescence of a pair), and of another in the thorax (formed by the coalescence of four pairs), with which the cephalic ganglion is connected in the usual mode, namely, by two nervous cords, which diverge from each other to embrace the œsophagus.”—*Microscope*, p. 638.

As regards food, the two species under consideration must, I think, be classed under the head of “scavengers.” I have kept twenty or thirty in a tumbler for some three months past, with a few frouds of *Corallina officinalis*, on which are Bower-



bankia, Pedicellina, Coryne, &c.; the polyps are mostly still healthy, and the Pyenogons do not seem to interfere with them. They are constantly crawling over the weed and about the bottom of the glass,



Fig. 41. Head of *Achelia hispidata*, showing position of gizzard,  $\times 70$ .  
A, triradiate mouth, further magnified.

and I have no doubt they subsist upon the decaying portions of weed—dead polyps, &c. At all events, to judge from the contents of their numerous stomachs, they cannot be classed with the “starving poor.”

In conclusion I would commend this very curious class of animals to the attention of students of marine life. There are many points of their organization which require patient investigation, and respecting their propagation and development very little appears to be known. The foregoing, or allied species, are, I have no doubt, common on every shore, and many others inhabit deep water, while the great transparency of their bodies, and their hardness in confinement, render them eminently suitable for prolonged microscopic research.\*

Dover.

EDWARD HORSNAILL.

\* I have to express my obligations to the Editor of SCIENCE-GOSSIP for his kindness in placing specimens of the subjects of the foregoing paper in the hands of Mr. Spence Bate for identification.

## CROSS FERTILIZATION OF THE DAISY AND COMPOSITÆ GENERALLY.

COMPOSITÆ is the largest natural order in the vegetable kingdom, and is therefore of vast scientific importance. It comprehends nearly 10,000 species of plants, and yet an easily-detected family likeness pervades the whole of that unwieldy number. I believe that no one in England before now has pointed out why the anthers are syngeneis, or traced the relation between the chief contrivances with which composites are furnished for aiding in, if not securing, cross fertilization, and, as the doing of these things is likely to impart a new interest to a subject generally considered dull, I venture to lay before the readers of SCIENCE-GOSSIP the leading principles of the whole matter, as illustrated by the Daisy, leaving details and what few exceptions there are to be treated of on another occasion.

For the sake of those who are not botanists it will be necessary to explain the meaning of the technical terms to be made use of in this paper.

Every complete flower consists of four perfectly distinct organs. Starting at the outside and proceeding towards the centre the first of these organs is called the calyx; the second, the corolla; the third consists of stamens, and the fourth is called the pistil. In the generality of flowers, such as that of the Primrose for example, the calyx looks like a green socket surrounding the base of the corolla, but, in *Compositæ*, the calyx is represented by nothing more prominent than long hairs, which aid in the dispersion of the seed. As a rule, the corolla is the gayest and most conspicuous of all the organs; but, compared with those which it surrounds and helps to protect, it is unimportant. Each stamen consists of a filament or little stalk, and an anther for containing pollen. Passing from the stamens the pistil is next reached, and it occupies the centre of the flower. It consists of an ovary for inclosing ovules; of a style, generally about the thickness of a thread, which surmounts the ovary; and of an enlargement at the top of the style, designated the stigma, which becomes sticky, and receives the pollen to impregnate the ovules. The stamens and pistil are consequently all-important; the former being the male, and the latter the female portions of the flower, and, of course, both are necessary for the production of perfect seed.

The preceding description of a flower, and of the offices which its organs discharge, should enable any one of ordinary intelligence to understand the account which follows of the curious designs with which the Daisy is furnished for securing a given end, and I now proceed to relate what those designs are, and as much as I know of their action.

A magnifying-glass of moderate power shows that what is by most people considered the “flower” of



the Daisy is in reality a head of very small distinct flowers arranged on a hollow cone-shaped receptacle or seat.

The flower-head of the Daisy is called a capitulum, and the handsome conspicuous florets round the edge of the head are called florets of the ray, whilst all the little yellow florets inside of the ligulate, or ray florets, are termed florets of the disk. The florets of the ray expand, or are in blossom first, and are very different in several respects from those of the disk. In the first place the ray-florets, owing to the large one-sided corolla with which each is provided, make the capitulum look like a single flower. In the second place they have no stamens,

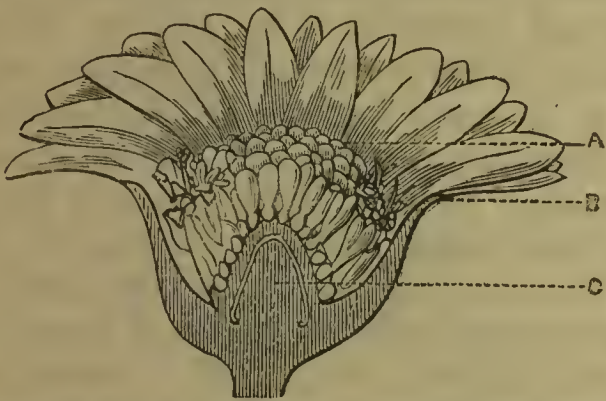


Fig. 42 shows the half of a daisy flower-head. The dotted line from A runs into the disk-florets, that from B into the ray-florets, and that from C into the receptacle.

and are, in consequence, named unisexual; but this suppression, instead of being an unmitigated defect, is a most admirable piece of economy, as will presently appear. In the third place the upper part of the pistil is without bristles or roughness of any kind, because neither bristles nor similar appendages

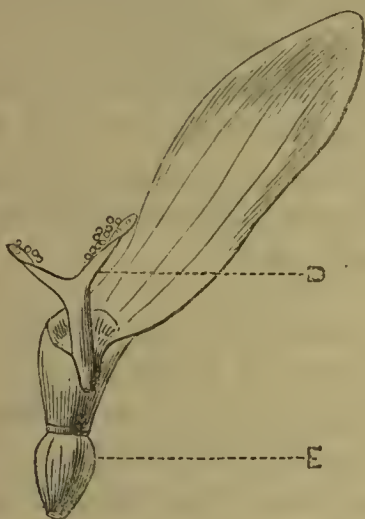


Fig. 43 shows a ligulate floret magnified. The line from D runs into the style, where it forks, and that from E into the ovary. On the stigmatic surface of each division of the fork are some pollen-grains.

are required. And, lastly, the arms or divisions of the style are comparatively long, and, when fully ready for performing their function, are spread out as much as possible, and even twisted, as if determined to lay siege to every direction in order to catch pollen. Figures 42 and 43 illustrate these remarks; but the utility of the various parts, and the movements they go through, cannot be understood

before the action of a tubular hermaphrodite floret is considered, and to such a floret the attention may now be directed.

Its smallness need hardly be more than alluded to. Nearly all the organs require to be looked at through a lens in order to be seen satisfactorily. The corolla at the bottom might admit the point of a small pin, but would do no more. A slight enlargement commences just where the filaments cease to adhere, and is continued, with a gradual increase, to the apex. The anthers, as is well known, are what is called syngenesious, that is, joined by their edges, and so form a tube, which fits tightly round the upper part of the style; and their adjustment in this way is exceedingly important, for, were they placed otherwise, one can hardly conceive how the scattering of the pollen could take place, because, owing to the very reduced scale on which everything is constructed, even the most determined efforts of insects to render aid would be unavailing. But this cohesion of the anthers, if looked at alone, and not as part of a device, is robbed of the greater portion of its beauty, and, as the style alone is needed to give finish and completeness to this design, an investigation of that organ will be proceeded with at once. There is a striking difference between the style of this tubular floret and that of a ligulate floret already described. Here the upper part of the style is very rough, being well furnished with distinct protuberances, or bristles, which are of great moment, inasmuch as the style in its present position would not be of any use

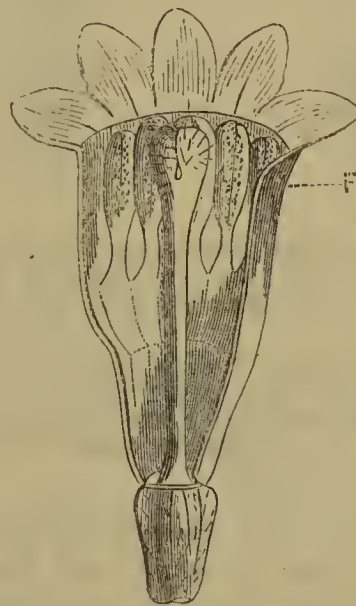


Fig. 44 shows a tubular hermaphrodite floret cut open for the purpose of showing the internal arrangement. Opposite the line running from F are the syngenesious anthers, with the pollen undischarged, and the bristly thickened extremity of the style.

without them, because no farina would be forthcoming. As it is, however, there stands the bristly-headed style, surrounded and embraced by the anthers, and patiently waiting for these to shed their pollen, in order that it may move on immediately afterwards. In short, the conclusion of that event, which almost seems to be steadily waited



for, is the signal for a growth to set in, which growth, on the part of the style, has the effect of elevating pollen a considerable distance above the outstretched stigmas of previously expanded flowers.

These last stigmas are alone receptive or ready for receiving and using the pollen-grains, and on them the said grains very naturally descend. Shortly after the apex of the style emerges from the summit of the anther-formed tube, its two arms are beginning to separate, and by this movement the falling of the pollen is accelerated. By the time the style has reached its full stature, its two arms are as wide apart as they can go, and each arm has its smooth side looking up and its rough down, so that the young styles, which might be compared to the instrument used for sweeping chimneys with, act so as to help the viscid stigmas of more fully developed ones to pollen; and this co-operation, or whatever else one may call it, goes on until all are served, or at least until all the pollen is raised out of the anthers.

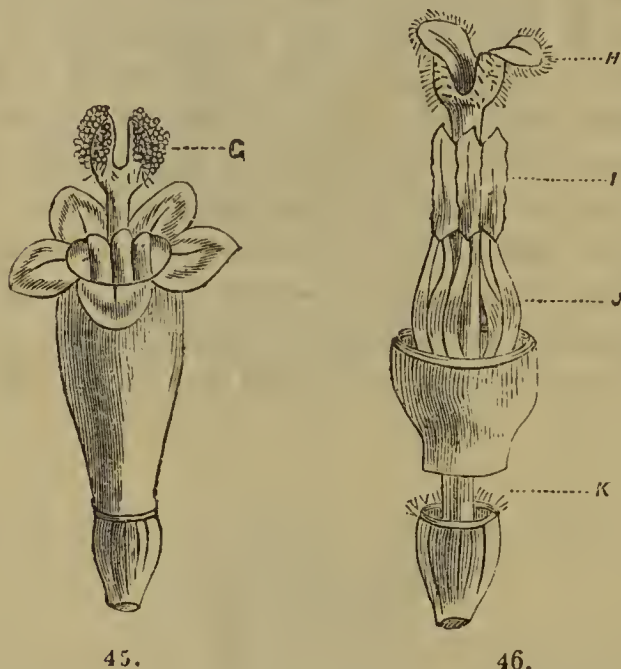


Fig. 45 shows a tubular hermaphrodite floret magnified. The line from G runs into the thickened upper part of the style, after it has emerged from the anther-tube, laden with pollen.

Fig. 46. The line from H runs into one of the outstretched arms of a style; that from I runs into the syngenesious anthers; that from J into the filaments; and that from K into the style, just before it joins the top of the ovary.

Figures 44, 45, and 46 illustrate everything connected with a tubular floret, and I may here state that the drawings are by Mr. Burbidge.

As insects are generally present where cross fertilization is going on, one might expect to find them actively engaged in preventing the Daisy from degenerating; but it so happens that this prolific little plant does not require their services, for what its own beautiful contrivances leave unperformed the wind performs. It is pretty clear, too, that insects are not such a disinterested lot of beings as to pay systematic visits without deriving any benefit therefrom themselves. It is also certain that instinct never struggles so much against one set of

creatures as to make them blunder continually for the good of another set. And as the Daisy has nothing better than a very miserable pittance of pollen to part with, it follows that it is left alone in its glory.

JOHN DUNCAN.

## THE DARK ARCHES MOTH.

(*Xylophasia polyodon*.)

THIS is one of the very common moths at "sugar" in our London suburbs; and holds its own after other species, more interesting to the collector, have been "startled from their propriety" by the bricks and scaffolding of the builder. Not much appears to be known about the caterpillar, for Newman, in his recent work on British Moths, quotes from Hubner, not having had it brought under his own notice. I reared, in the spring of last year, some *larvæ* which produced this species. They were discovered feeding on the Chrysanthemum, being then very small, on the 4th of August, 1868, and were supposed, at the time, to belong to the ubiquitous *M. Brassicæ*. They were placed in a breeding-cage, and continued to eat, but grew very slowly. During the day they retired to the surface of the earth, not however burying themselves, but hiding under the dead leaves and stalks, usually stretching themselves out side by side with great regularity. Night appeared to be their feeding-time, though they would occasionally be found upon the food-plant in early morning. They did not entirely cease to eat until the 15th of November, when they hybernated until the beginning of April. Of the adult caterpillar, I had a description, unfortunately mislaid; I observed no traces of the warts delineated by Hubner; the ground colour was a dull brown, with faint stripes running from the head to the anus; head small and very glabrous. The moths appeared rather later than usual.

THE GIPSY-MOTH (*Liparis dispar*).—I see, from time to time, offers of the eggs of this species in scientific journals. As far as I know, all these produce what is called the northern, or dwarf type, which has been bred "in and in" for some years past by collectors. It would be interesting to ascertain whether the normal form does at all occur now in the British islands; or could the diminutive form be brought up to the full size again by any mode of treatment. On one occasion, I liberated, by way of experiment, a largish number of these caterpillars near London, placing them on willow, which seems most congenial to their taste. However, subsequently, I was unable to discover either cocoons or moths. The species is an interesting one to rear in confinement.

J. R. S. CLIFFORD.

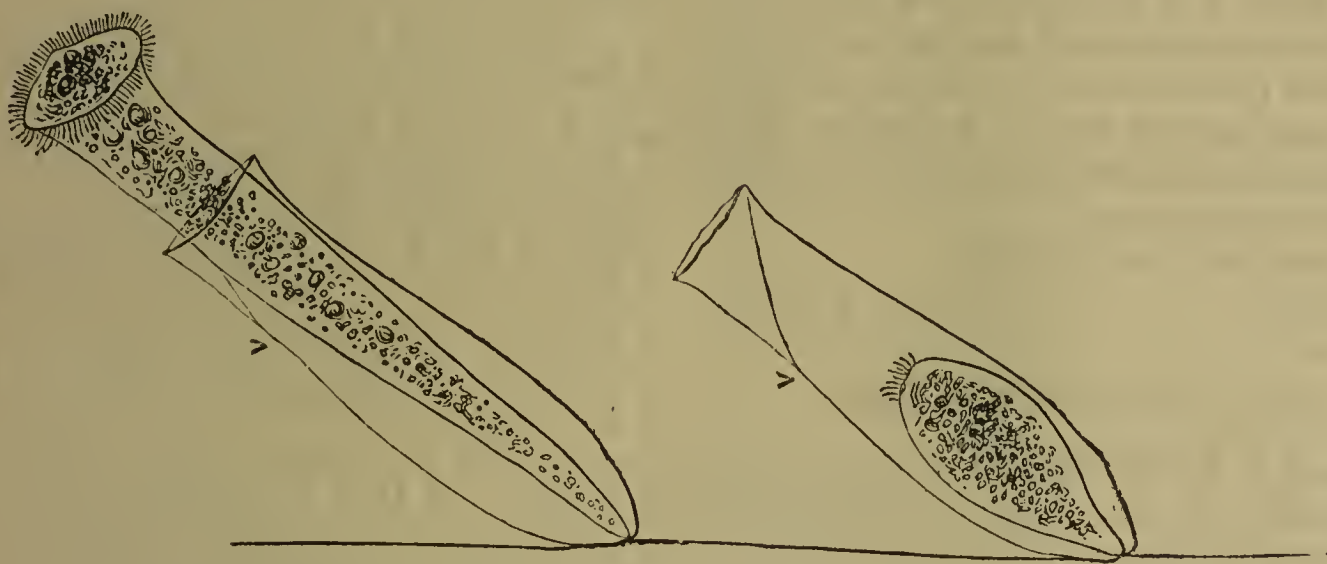


## FRESH-WATER VALVED VAGINICOLA.

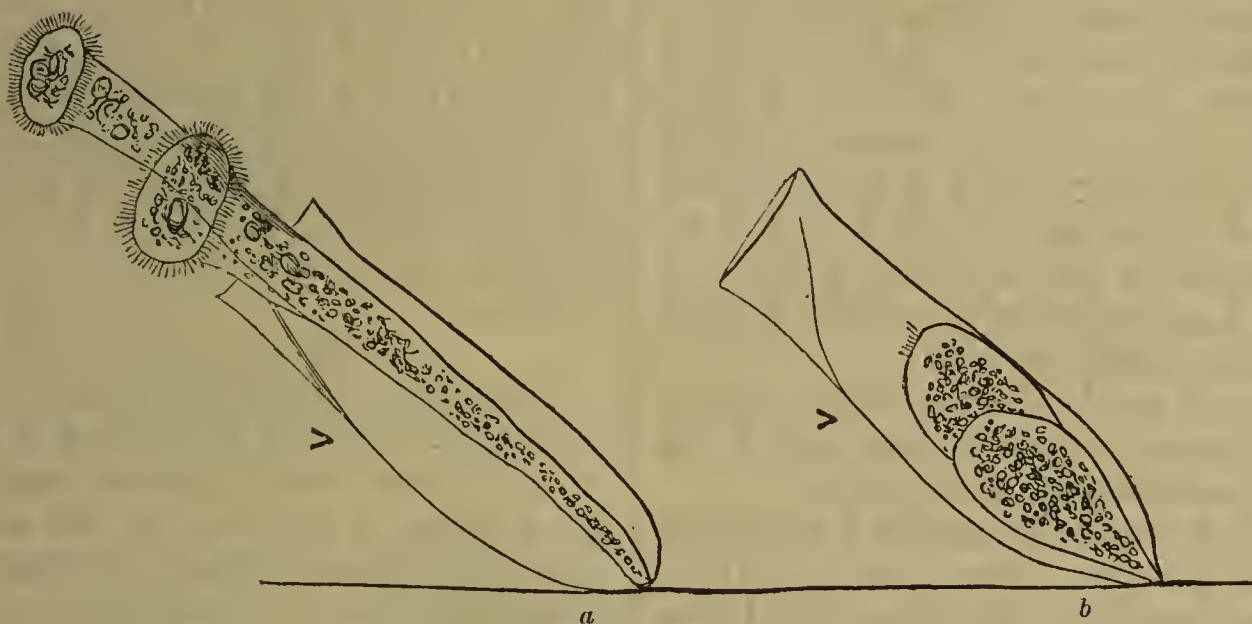
I HAVE recently observed a *Vaginicola* which is new to me, and which I do not remember to have seen anywhere described or figured. Its distinguishing characteristic is the possession of a valve, somewhat similar in shape and structure to, but apparently much more delicate than, that in *Vaginicola valvata*, figured in Plate 28 of the 4th edition of Pritchard's "Infusoria."

The only valved *Vaginicolæ* with which I have been previously acquainted are *V. valvata*, which is a marine species, and in which, according to the figure before referred to, the lorica is cylindrical,

differs materially from the species I have recently observed, in which the lorica is urceolate or vase-shaped, hyaline, and terminating at the foot nearly in a point. The valve, which is very delicate, and in some instances requires careful illumination in order to distinguish it, is attached to the side of the lorica about one third of its length from the top, and moves freely on its point of attachment, moving up on the protrusion of the animal, and immediately closing again on its withdrawing itself, which it does very rapidly on being alarmed, as for instance, by a tap on the glass trough or stage. The body, when expanded, is about  $\frac{1}{80}$  inch in length and gradually tapers from the head, which is crowned

Fig. 47. *Vaginicola*. a, extended;

b, withdrawn.

Fig. 48. *Vaginicola*, after fission.

with a flat base; and *Vaginicola valvata*, figured and described under that name by Mr. Slack in vol. ix. of the *Intellectual Observer*, p. 205. In this species the lorica is irregular but approximately cylindrical, and the valve has a peculiar structure, being bent back upon itself when the animal is protruded, and closing by its own elasticity on the animal retracting itself: see fig. 49, which is a copy of Mr. Slack's diagram representing this structure, A closing on B when the animal protrudes.

This, the only fresh-water valved *Vaginicola* which, so far as I am aware, has hitherto been described,

with cilia, to the oot; when retracted, it is pear-shaped, a slight tuft of cilia being generally apparent at the broader end.

Several well-marked vacuoles are observable, and in all the specimens I have examined the body is nearly filled with green granules. There are often two animals inhabiting the same lorica, the result of longitudinal fission. Fig. 47a shows the animal extended; fig. 47b the same withdrawn, in each case the letter *v* pointing out the valve: figs. 48a and 48b represent the same specimen about seventeen hours after the preceding figures were drawn, the animal



having in the mean time undergone fission, and developed a perfect ciliated head on each part of the duplicated body.

The specimens observed by me were found in the latter part of October last, attached to *Chara vulgaris* in a stagnant pool of fresh water formed from the overflow of a canal near Winchester. If this species has not hitherto been described, the following description may suffice:—

*Vaginicola* —(?) ; tube or lorica crystalline, urceolate about  $\frac{1}{125}$  inch in length, with a valve apparently formed of the same substance, affixed to the side about  $\frac{1}{3}$  of its length from the top, and moving freely on its point of attachment, closing in an inclined position over the animal on its withdrawing itself into the lorica. Body about  $\frac{1}{80}$  inch in length, with many vacuoles, and nearly filled with bright green granules.

Hab. freshwater on *Chara*, &c.

Winchester.

F. I. WARNER.

#### LIGURIAN v. BLACK BEES.

IN my last communication I ventured, on the strength of the law of Parthenogenesis and my own experience, to state that there were no *hybrid drones*,—that in the commingling of the Ligurian (or Alpine) and black races of bees, the drones were, in respect of colour, either all Ligurian or all black, according as the *female* was the one or the other; the evidence for this is, I think, incontestable. From a semi-Ligurian or mongrel queen, the drone offspring would of course be *mongrel*, following, by the same law, the mother as regards complexion, but still, to the best of my belief, not *hybrids*. I say to the best of my belief because the case is not absolutely proven.\*

On this matter I would offer some further remarks, but as I have another subject to dwell upon, I feel I should be encroaching on valuable space.

I am glad to find that the question I sceptically proposed, "Are these bees distinct species at all?" is likely to get well ventilated. For my own part, I have no hesitation whatever in answering—no. The bees before us correspond in nature and habits so closely—there is no structural difference, their operations are the same, and their cell-construction is identical—that I cannot believe them other than varieties. If a difference exists, it does not seem to me sufficient to involve the term *specific*, and if the Ligurians are superior in quality, it must be remembered

\* I use the term *hybrid* in the sense implied by "D. D. B." in his query, and as given by Professor Huxley: "Male hybrids are those which, although possessing all the external appearance of perfect animals, are physiologically imperfect in the structural parts of the reproductive elements necessary to generation."

that they are a mountain variety, hardier, bolder, more vigorous.

It surely is not at all remarkable that the hive-bee, which has been in a state of domestication, like the horse and the dog, and with them has undoubtedly accompanied man in his migrations for thousands of years, should also, like them and him, have succumbed in a measure to local influences, and have been subject to variation in physical characteristics more or less marked. That some of these varieties should have remained locally permanent and prolific, yet actually merging under certain circumstances gradually one into the other,\* or that they should have been brought advisedly together by ancient cultivators, is still less remarkable.†

From careful attention, therefore, to the subject, I am led to believe,—(1) That all the various honey-bees of assured domesticity, the *Apis mellifica*, which with civilization has extended itself over the principal part of Europe, North Africa, parts of Asia, as well as North America: the *Apis ligustica* of North Italy, Greece, the Archipelago, parts of Syria and Palestine; the aurora-coloured bees from Flanders, described by Della Rocca, 1790; *A. fasciata* of Lower Egypt and Nubia; and even the *A. Adansonii* of Senegal and Gambia, though differing from one another, and even *among themselves*, in disposition and certain physical characteristics, are but local varieties of some primitive stock, and no more distinct species than the varieties of the human race that have cultivated them through successive generations. (2) That these varieties would be found to commingle readily and produce males resembling in complexion the female parent alone: and workers and queens partaking more or less of the peculiarities of each variety, according to the energy of the respective reproductive elements.

Plymouth.

J. W. STROUD.

SYMPHYTUM TUBEROSUM.—My specimens of *Symphytum tuberosum*, L., referred to by "R. T., M.A.," in your current number, were growing in the direction he indicates, but still sufficiently removed from Barnet to bring the habitat within the county of Middlesex. I was quite unaware that my communication to SCIENCE-GOSSIP had furnished any data to the compilers of County Flora.—J. W. White.

\* Had "D. D. B." seen the remainder of Hermann's account of the Ligurian Bee, which is not given in Neighbour's book, this fact would have been obvious, at least in the instance immediately under notice, when he adds, "The farther one goes from the Alps the *less handsome* these bees are found, as for example in Nice, until they are *entirely lost* in Lower Italy in the black species." A similar statement is made also by Spinola, who, I think, was the first to notice the peculiarities of this bee, and to name it *Apis ligustica* in his *Insectorum Liguria Species, novae aut rariores*, 1806, p. 133.

† Aristotle, B.C. 330, speaks descriptively of four kinds of bees. Virgil, B.C. 35; Varro, B.C. 50; and Columella, A.D. 50, give descriptions of two.



## THE TEAL.

*(Anas crecca.)*

OF all the prizes with which a wild-fowl shooter could wish to meet, a *spring* of Teal is amongst the first. Independently of their being by far the best birds of the whole duck tribe for the table, they are generally much easier to get at; and as they require but a slight blow to bring them down, it matters little what charge of shot is in the barrels.

The quiet rushy pools which lie at a distance from any road, the turf-holes on a peat-bog, and the sluggish shallow streams with overhanging vegetation, are the favourite haunts of the Teal. In some parts of the country this bird is resident throughout the year, but as a rule, and in the South of England especially, it can only be looked upon as a winter visitant. Of shy and retired habits, it shuns the more public ponds and rivers, and avoids the habitation of man. The extended drainage of waste lands and increased cultivation have no doubt conducted more than anything else to the scarcity of a bird which was once plentifully distributed over the entire country.

On approaching the edge of a pond at a distance from a flock of Teal, they may be seen silently reposing on the water. Immediately the intruder is perceived, a harsh call is heard, and they spring suddenly into the air, wheeling round and about with amazing rapidity, now looking black now white, according as the upper or under surface of their bodies is presented to the eye. Frequently, as though intending to alight, they fall through the air with a whistling sound, recovering themselves when apparently in the water, and rising again to a height. These manœuvres are repeated until the eye is strained in following them, and the whole flock at length settle down again in silence and repose as before. At such times it requires no small amount of caution to get near enough to them for a shot.

Col. Hawker, whose practical knowledge of wild-fowl has rarely if ever been equalled, has described the habits of the Teal very accurately in his "Instructions to Young Sportsmen."

"If you spring a Teal, he will not soar up and leave the country, like a wild duck, but will most probably keep along the brook, like a sharp-flying woodcock, and then drop suddenly down. But you must keep your eye on the place, as he is very apt to get up again, and fly to another spot before he will quietly settle. He will frequently, too, swim down stream the moment after he drops; so that if you do not cast your eye quickly that way, instead of continuing to look for him in one spot, he will probably catch sight of you and fly up, while your attention is directed to the wrong place. If the

brook in which you find him is obscured by many trees, you had better direct your follower to make a large circle, and get ahead of, and watch him, in case he should slyly skim away down the brook, and, by this means, escape from you altogether."

The female Teal, like the females of all the duck tribe, has little to recommend it in appearance, although the observant naturalist does not fail to notice that its dusky brown and grey plumage is peculiarly well adapted to its concealment during the time it is engaged in nesting. The cock Teal, on the other hand, has scarcely an equal amongst wildfowl for beauty of colouring. The chestnut head, with a patch of glossy green on each side, edged with buff; the neck, back, and flanks beautifully pencilled with black and grey; the bright green speculum on the wing, broadly bordered above and below with velvet black; and the black and buff under tail-coverts present to the eye a perfect picture of harmonizing colour which defies the imitative pencil of the artist.

In July the old Teal moult, completely losing their quill-feathers, and are then for a time unable to fly. The males at this season undergo that remarkable change of plumage which has been observed in other ducks,—losing all the colours which are characteristic of their sex, and presenting a very sorry appearance in contrast with their spring dress. The young at this time are able to shift for themselves, for the Teal nests early in the year. We have several times found the eggs during the last week of April. Although usually placed in the vicinity of water, the nest is sometimes at a considerable distance from it, and always rests upon dry ground. We have never found a Teal's nest in the swampy situations in which Coots, Moorhens, and Grebes build.

A hollow is generally scraped out at the foot of some overhanging bunch of heather, or tussock of dry waving grass, and lined with fine heath stalks and bents. Here eight or ten creamy-white eggs, are laid, and as the hen covers them, she plucks from her breast and sides the soft brown down which underlies her feathers, and places it entirely round the eggs, filling up all the interstices, thus forming a warm bed for the young as soon as they leave the shell. The overhanging roof of grass or heather conceals from above the clutch of white eggs, which would otherwise be espied by the passing crow and assuredly be carried off by this thievish bird.

The old duck is very attentive to her young, leading them from the nest to the marsh, where they paddle about on the soft ground and shallow pools, snapping up flies and beetles with their tiny bills, and varying their meal with the seeds of aquatic plants. They swim and dive well almost as soon as hatched; but how they contrive to follow their parents through the long heather and the



tangled rank herbage of the marsh without getting lost, has always been to us a matter of wonder and admiration.

A remarkable instance of affection in a Teal came under our observation towards the close of a mild winter. We were shooting over a wild bit of country where Ducks, Teal, and Snipe abound, and remain annually to breed in limited numbers. A rare spot it was for the naturalist, who might there to his heart's content enjoy that varied description of shooting which to our mind is so preferable to every other branch of the sport. Treading on a patch of soft ground, away went three or four Snipe with loud squeaks in different directions. Down came one, and

scampered away through the flags. Having pretty well disturbed that particular spot, we moved on, not without regret at having left the Water-rail behind us. Walking towards the head of a pool where a thick growth of flags seemed to indicate the probable presence of wildfowl, we were barely in sight of the water before a fine old Mallard rose with loud quacks, and with outstretched neck and legs, did his best to get away before a charge could reach him. But alas! he was doomed to die; and as he tumbled upon the grass with a thump which made one's heart rejoice, a couple of Teal, alarmed at the report, sprang from the flags within a few yards of him.

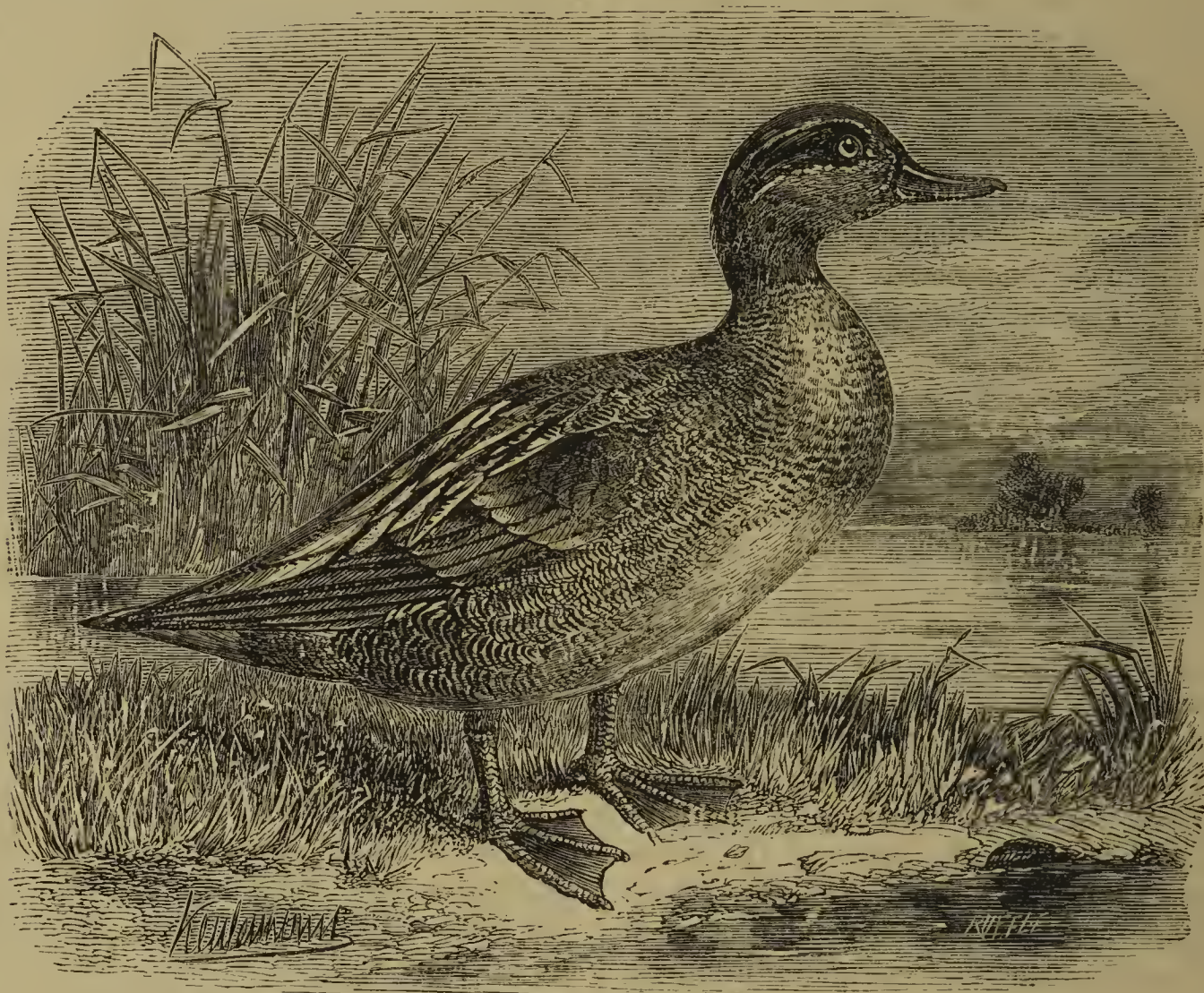


Fig. 50. THE TEAL (*Anas crecca*).

another was missed; before we could load two more had gone away. Picking up the product of the first barrel, we almost trod upon a Water-rail which rose close to us, and with long legs dangling down, flitted over the rushes towards the water. But so good a bird for the table could not be allowed to go, and so down it came, an easy shot, and was lost to sight amongst the rank herbage. Unfortunately it was only winged, and being without a dog that day, we spent ten minutes or a quarter of an hour vainly endeavouring to find it. Meantime, however, we had put up and brought down another Snipe, and caught a hasty view of a Moorhen as it

The duck being the nearest received the contents of the remaining barrel, and fell dead upon the soft mud at the very edge of the water. While speculating upon our good luck, and putting in two fresh cartridges, the cock Teal, which had flown up to the other end of the pool when his mate fell, turned back, and after flying up and down several times with mournful notes, returned to the spot whence he rose, and pitched upon the mud close to the dead duck. Here he remained for some seconds, nodding his head and curtsying, as if about to take wing,—uttering a low note the while as if to entice away the duck, whom he appeared so loth to leave.



We were so struck at this manifestation of affection that we could not find it in our heart to shoot at the poor bird, and as we moved on to pick up his mate, he rose and was soon out of range again.

It is not improbable that the mildness of the season induced these birds to pair earlier than usual, for at the time of year at which the above incident occurred, Teal and other wildfowl are generally found in flocks.

Large numbers of these birds pass southwards for the winter, repassing again in the spring on the way back to their breeding-haunts. In September and October they collect in large flocks, and, as they fly a good deal lower and closer together than most other ducks, several may be killed at once by a well-directed shot. This is especially the case if the shooter be in ambush close to the water which they frequent; but as their flight is exceedingly rapid, care should be taken to hold well in front of the leading bird.

Teal are very sociable in their habits, and during the winter they may often be found in company with the common wild ducks. But although they mingle together when on the water, on being disturbed the species always separate, the Teal going off in one flock, the ducks in another. On rising from the water they do not first swim away from the danger, or flutter over the surface as some fowl do, but jump suddenly into the air without warning, so that if you are approaching them in a punt and do not pull the trigger the moment you find that you are perceived by them, you will in all probability lose your chance of a shot.

During the winter months this species is frequently found on the coast in company with Widgeon, and large numbers are often killed at a single shot with a punt-gun.

The Teal, however, appears to prefer the neighbourhood of fresh water, and is certainly one of the most beautiful ornaments in the winter scenery of our ponds and brooks.

J. E. HARTING.

DIATOMS.—We have received a rejoinder from Mr. McLeod, in reply to Mr. Kitton's letter in our last. It would occupy far too much of our space to permit this and similar controversies on topics which have an evident tendency to become personal. After all, we imagine that Mr. McLeod intended merely to condemn the abuse, which some of us know to exist, of wasting time and money in resolving test-objects with no laudable motive, when so much good service might be done to science by the application of the same time and perseverance in other ways. From this conclusion we are certain that Mr. Kitton would not dissent. Diatoms are as legitimate objects as any other, if legitimately studied.

#### ABNORMAL PLANTAIN.



Fig. 51. Abnormal Plantain, *Plantago coronopus*.

The above figure of the curious form of Plantain, noticed in our December issue (p. 280), was unavoidably omitted when the [description was inserted. Readers will therefore please to refer to the page indicated for full particulars. It was gathered by Mr. J. C. Melville near Wallasey, in Cheshire, in May, 1868. Though curious and interesting, it is by no means unique, as similar forms have been observed before.

SILICEO-FIBROUS SPONGES.—An excellent monograph on this subject, by Dr. Bowerbank, with nine plates, is published in the Proceedings of the Zoological Society of London for 1869.



## POPULAR GEOLOGY.\*

ALTHOUGH there is no "royal road to science," and a sound naturalist is not born of dressing-gown and slippers, but of hard knocks and long walks, yet much help is afforded even to abstruse science by the "popular guides" of the present generation. One of the first steps towards increasing the number of students in a particular science seems to be to obtain an audience, to secure interest in the study from some who have never given to it the slightest attention heretofore. If nothing else could be predicated of books on popular science—if they only stir up a desire in the minds of a few individuals to obtain more light, and stimulate them to a little exertion to obtain it, they will have accomplished good work. It is a very poor "guide" which does not succeed even beyond this, by laying a good foundation, and sketching out the design of the superstructure to be reared thereon. Just those branches of science to which there is no popular introduction or portable handbook, are behind all the rest in the number of students, in the interest which they occasion, and in the deplorable ignorance of even educated men of the most elementary of its facts. We hail with interest every faithful effort to introduce science to the outside world, and canvass for followers, and we welcome every zealous worker, who by his influence promises to obtain recruits. Everybody who met with the British Association in Norwich (1868) will remember with pleasure the honorary secretary of the local Geological Society. Having devoted himself, in all the enthusiasm of youth, to this "hobby" of his, he rides it all over the county, picking up his geological crumbs, and the result is that he has become—just what he deserves to be—quite an authority on Norfolk geology.

The books before us are not all "just published"; the "Geological Essays," especially, date some four or five years ago; but they are all characterized by those genial features which are by no means patent to books on popular science. For instance, the author is practically well up in his subject by experience gained in the field. Some people have compiled books at their own fireside, by picking other men's brains, and "popular" books too; but they have their reward. Mr. Taylor writes also in a plain and agreeable manner. He says what he has to say just as if he meant to have it understood; and, moreover, he is so poetical at times, so attrac-

tive, and so suggestive, that step by step the reader is compelled to follow him, whether he will or no, on, on, and on to the end of the volume. It is sometimes objected to men of science, that their dry-as-dust notions will not accord with any knowledge or appreciation of polite literature. *Here* is plenty of evidence to the contrary, in quotations from the poets, Shakespeare down to Tennyson, and in allusion to writings sacred and profane, sufficient to prove that our author has read much, remembered well, and is, consequently, a most agreeable companion. Those who complain of the scepticism of modern science—especially geology—should read Mr. Taylor's books and then—be silent.

## RIBS OF THE DUN COW.

I AGREE with your correspondent "G. B." that it would be interesting to ascertain the number of these ribs at present exhibited. A few days ago I paid a visit to that interesting spot which was once the proud capital and strong citadel of Wales. I allude to Caerleon, at present a small insignificant village, three miles from Newport, but still much frequented by those who feel an interest in the ancient history of their fatherland; for this pretty spot is encircled by many hallowed associations, and is connected more deeply than any other town in Wales with the history of King Arthur, whom none of us would like to regard as a fabulous personage.

Caerleon boasts a museum, containing a very valuable collection of Roman and old British relics; and here also is to be seen a rib of the dun cow, this specimen having lain in a neighbouring church for very many years, and had been recently removed to the museum. One fact should be noted in the conformation of the rib, viz., its *great breadth*, measuring from margin to margin full six inches. But the great peculiarity in the structure of this rib evidently is the anatomical relations of its margins, which must be termed external and internal, the *flat* of the rib being placed transversely to the body of the animal. Trusting through the medium of your paper more light may be thrown on the subject, I wish to remark, in conclusion, that it may be a significant fact in attempting to unravel this mystery, that in the four places already named as possessing one of these curiosities, viz., Chesterfield, Warwick, Bristol, and Caerleon, they were all deposited in a church.

ARTHUR LLEWELLYN.

\* "Geological Essays and Sketch of the Geology of Manchester and the Neighbourhood." By John E. Taylor. London: Simpkin, Marshall, & Co.

"Lithographs, a Series of Four Lectures on Geology, delivered before the Norwich Geological Society." By John E. Taylor, Hon. Sec. London: Hamilton, Adams, & Co.

"On Certain Phenomena in the Drift near Norwich." By John E. Taylor. Reprinted from the *Geological Magazine*.

THE following extract respecting the "dun cow" is taken from a book called "Facts," by Sir Richard Phillips, published in 1840:—

"The wild ox, formerly dangerous in British woods, is now only found in the fossil state in recent formations, or in strata with elephants' bones, or in three or four parks as curiosities. It is white,



with a black muzzle, and very vicious. The Dun cow of Dunchurch and Warwick Castle was one."

H. D.

I recollect when travelling through the south of Lincolnshire into Norfolk twenty years ago, staying at an inn, in one of the rooms of which was an enormous *scapula* fastened up in a corner near the ceiling. On it was this inscription: "Ye Blade bone of ye Wonderful Dun Cow." I was but a boy then, but I remember thinking what a terrific size the cow must have been. I am sorry I cannot recollect the name of the place; but perhaps it is known to some of your readers.

HY. ULLYETT.

#### RARE LARVÆ, ETC.

MR. NEWMAN'S work on British moths, admirable as it is, shows that there are still many species of which the caterpillars are either utterly or almost unknown, or strange to us but for descriptions in foreign manuals. Having paid some attention during the past year to the lepidoptera of this district, I am able to supply one or two of the omissions in that work; and I have no doubt that, if entomology continues to be as popular as it now is, almost every one of these obscure larvæ will in a few years be brought to light.

*Larvæ of Cidaria miata*.—Of this caterpillar, so rarely seen as to be unknown to the celebrated Guenée, Newman obtains his very slender information from "Stainton's Manual." It was common near Richmond last season. With the help of my sons, I found about twenty, almost all on low willow bushes, with which the banks of the Swale abound. On whitethorn we found, I think, only one, and one on poplar. They were all obtained between the middle and end of July, by careful search, not by beating, and appear to be tolerably hardy, as we succeeded in rearing about three-fifths. As might be expected, they closely resemble the larvæ of *Cidaria psittacata*, being almost uniformly cylindrical, without humps, and having the two points projecting from the anal segment; but the colour is remarkably uniform, and darker below than above, a peculiarity which, wherever it exists in animals, gives a somewhat singular appearance. The dorsal area is pale yellowish-green, the ventral dull red. As they always feed with their backs downwards, this gives them the exact appearance of the main rib of a willow-leaf, and makes them very difficult to discover, especially as, though long for the size of the moth, they are very slender, even when full fed. The chrysalis, contained in a very slight cocoon, is of a rich warm brown.

*Larva of Eunomos tiliaria*.—Mr. Battersby has found this caterpillar several times in Ireland, and described it; but no English specimen has, I believe,

yet been made known. The day after I first found *Cidaria miata*, and within a yard of the same spot, I discovered another strange geometer, which proved to be the larva of the beautiful canary-shouldered Thorn. It also frequents low salallows; the only other specimen we found being a magnificent full-grown one, on a bush scarcely more than a foot high. Treitsche's description is fairly correct as far as it goes:—"Wrinkled, brown, marbled with darker brown, with humps on the sixth and tenth segments, gradually increasing in size." But both he and Mr. Battersby have omitted the most distinctive mark of the species; at least it was so in both my specimens. In front of the first hump is a large oblong, or, more correctly speaking, trapezoidal spot, of a very dark brown, and another before the last hump, of exactly the same shape, but still larger, corresponding to the increased bulk of the body. It spins a compact web, and the chrysalis must be very handsome, judging from the shell after emergence, which is of a beautiful orange tint.

*Polia flavocincta* (the large ranunculus) is given by Newman as unknown in the north of England. It was rather common here in all its stages last summer.

It may interest some of your readers to know that the banks of the Swale seem to be "the happy hunting-grounds" of all who want Puss-moths and kittens. Of the former we found, in July and August, within a range of three or four miles, and close to the water, about two hundred larvæ; in fact, a great many more than we cared to take. It was painful, however, to see a fine kitten larva attacked and stung to death by a wasp. We afterwards found another (a half-grown puss) evidently destroyed in the same manner.

Richmond, Yorkshire.

G. P. HARRIS.

#### ROSEMARY AND RUE.

"Reverend sirs,

For you there's Rosemary and Rue; these keep  
Seeming and savour all the winter long:  
Grace and remembrance be to you both,"

Says Perdita in the "Winter's Tale"; and, although Rosemary is not, strictly speaking, an herb, I am inclined, on account of its many virtues, old associations, and far-off memories, to place it side by side with the herb of grace in my herb-garden, as the Bard of Avon has, in the above passage, joined the twain together in his immortal verse.

The names by which this evergreen is known in all foreign languages have reference to some especial use or property. *Herba coronaria*, one of its Latin appellations, alludes to its being employed with other plants in the formation of wreaths and chaplets; whilst the generic name *Ros*, dew, and *Marinus*, of the sea, betokens its habitat—the rocks of the southern countries of Europe. Perhaps some



reader of SCIENCE-GOSSIP, who is well up in the Chinese tongue, will kindly tell us the meaning of *Yong tsao*, the name the Celestials know it best by. The Welsh *Rhos Mair* signifies Mary's Rose; because, so say some of the village crones, the plant never thrives well in a garden where the mistress is not master. It is the good wife's evidence of authority is a well-to-do rosemary-bush, and I am told a like belief is held in some parts of Gloucestershire respecting it.

The wild Rosemary is larger than the cultivated, and there are two kinds or varieties of the latter—one the silver, from its white striped leaves; the other the golden, because it has yellow bars on the foliage.

Our continental neighbours use Rosemary far more extensively than we do. German house-keepers steep it in a pickle, which they prepare for hams and tongues. I was once induced to try the effect of adding a handful of the flowers to a spiced pickle, which my cook was boiling up for the purpose of curing some beef, and I found the flavour it imparted to the meat so liked that I always afterwards put a few tops in with both ox-tongues and hams.

As a good cosmetic it has long been much lauded. The famous Hungary water had a very considerable portion of the extract of Rosemary in it. Rimmel in his "Book of Perfumes" (an admirable and most interesting work it is, too) mentions essence of rosemary as an agent in scenting soap, and notices the remarkable resemblance it bears in taste to camphor, whose medicinal properties I believe it also partakes of. It stimulates, and is highly approved of in nervous diseases. Many persons drink a tea made of the fresh young tops, which are said to possess greater power than the flowers. Then, as a hair-wash, hairdressers recommend it; but I really believe it tends in some way or other to turn the hair grey. More than one young lady of my acquaintance, who used Rosemary wash when it was so very highly introduced a few years ago, became grey quite early in life, and a medical man assured me then that the cause lay in the strong decoctions of Rosemary they had been applying to their pates. Grey hair in the present day is almost unknown. The herb of remembrance, as the ancients called it, was much in request at funerals and weddings. I never have known it used at marriages; but the custom of wearing a spray of Rosemary in the coat at a burial, and of taking it out and casting it into the grave, is still kept up by the lower classes in parts of South Wales.

"To show their love, the neighbours far and near  
Followed with wistful looks the damsel's bier;  
Sprigged Rosemary the lads and lasses bore,  
While dismally the parson walked before.  
Upon her grave the Rosemary they threw,  
The Daisy, Buttercup, and Endive blue."

## RUE.

"Here did she drop a tear; here in this place,  
I'll set a bank of Rue, sour herb of grace."

Rue, despite its strong and disagreeable scent, was doubtless much used in nosegays formerly; for one rarely takes up an old work but what it is mentioned. I wonder at the taste of those who used it, for I think I share in the dislike evinced by toads to it. You know of course that in ancient gardens it was always planted amongst Sage to keep off these reptiles. Insects of all kinds detest it, and shun a Rue plant; and my belief is, that the toads, not finding any provender in their Sage larders when Rue grew near, gave up such beds of *Salvia*, went to happier hunting-grounds, and so gained credit for the good taste of disliking Rue.

The stamens of the Rue are well worthy the careful notice of the botanist. They exhibit a singular phenomenon. Something similar has been observed in the Barberry, only in the latter case the effect is produced by touching the stamens. In the Rue they rise up spontaneously, and discharge the pollen when it is ripe, and then fall back to their former position on the petals.

Rue is not a native. It came originally from the south of Europe, and has been cultivated by us for ages, the wild Rue possessing all the bad qualities of its educated relative in a still stronger degree.

Even Pythagoras speaks of its power. It was known in the days of the philosopher, who propounded the still wise saying, or maxim, that "Everything was not to be told everybody." I do not mean that such a doctrine should hold good in regard to science, or else good-bye to our charming SCIENCE-GOSSIP, which one looks forward to with such interest monthly; and I know I shall be taken up for saying that Pythagoras spoke of the Rue, and told that none of his writings exist now. If he did not, some of his friends did—the countryman perchance who,

"Carnivorous sinner,  
Had pullets yesterday for dinner." (See *Guy*.)

HELEN E. WATNEY.

THE BRIGHTON AQUARIUM soon promises to become an established fact; a company has been formed, a prospectus issued, and the services of our old correspondent, Mr. W. Alford Lloyd, of the Hamburg Aquarium, secured. The site of the proposed aquarium, which will be upwards of 700 feet long and 100 feet wide, commences at the toll-houses of the Chain Pier, and extends to within a few yards of that structure. On the south side there will be a sea-wall and approach-road, towards which the Corporation of Brighton have agreed to contribute £7,000. Further particulars of John McMillan, Esq., Secretary, 7, Westminster Chambers, London, S.W.



## ZOOLOGY.

CICADÆ.—Captain Hancock informs me that the Brazilian Cicadæ sing so loud as to be heard at the distance of a mile. This is as if a man of ordinary stature, supposing his powers of voice increased in the ratio of his size, could be heard all over the world. So that Stentor himself becomes a mute when compared with these insects.—*Kirby, Introd.*

FIREFLIES.—If we are to believe Mouffet (and the story is not incredible), the appearance of the tropical Fireflies on one occasion led to a more important result than might have been expected from such a cause. He tells us that when Sir T. Cavendish and Sir R. Dudley first landed in the West Indies, and saw in the evening an infinite number of moving lights in the woods, which were merely these insects, they supposed that the Spaniards were advancing upon them, and immediately betook themselves to their ships; a result as well entitling the elaters to a commemoration feast as a similar good office of the land crabs of Hispaniola, which, as the Spaniards tell (and the story is confirmed by an anniversary *Fiesta de los Cangrejos*), by their clattering—mistaken by the enemy for the sound of Spanish cavalry close upon their heels—in like manner scared away a body of English invaders of the city of St. Domingo.—*Kirby, Introd.*

FOOD OF INSECTS.—Some insects in their perfect state, though furnished with organs of feeding, make no use of them, and consume no food whatever. Of this description are the moths which proceed from the silkworm, and several others of the same order; the different species of gadflies, and the ephemeræ insects, whose history is so well known as to afford a moral or a simile to those most ignorant of natural history. All these live so short a time in the perfect state as to need no food. Indeed it may be laid down as a general rule, that almost all insects in this state eat much less than in that of larva. The voracious caterpillar, when transformed into a butterfly, needs only a small quantity of honey; and the gluttonous maggot, when become a fly, contents itself with an occasional drop or two of any sweet liquid.—*Kirby, Introd.*

THE WOODLOUSE (*Armadillo vulgaris*) when alarmed rolls itself up into a little ball. In this attitude its legs and the underside of the body, which are soft, are entirely covered and defended by the hard crust that forms the upper surface of the animal. These balls are perfectly spherical, black, and shining, and belted with narrow white bands, so as to resemble beautiful beads; and, could they be preserved in this form and strung, would make very ornamental necklaces and bracelets. At least so thought Swammerdamm's maid, who, finding a number of these insects thus rolled up in her

master's garden, mistaking them for beads, employed herself in stringing them on a thread; when, to her great surprise, the poor animals beginning to move and struggle for their liberty, crying out and running away in the utmost alarm, she threw down her prize!—*Kirby, Introd.*

THE MOLE CRICKET (*Gryllotalpa*).—Of the extraordinary voracity and insensibility to pain sometimes exhibited by these insects, Nördlinger relates a striking example. It chanced that in a certain garden a mole cricket was struck by a spade, and completely divided into two nearly equal halves. In a quarter of an hour's time, the would-be slayer turned his eyes in the direction where lay the supposed corpse: what was his surprise and horror to see the forepart of the insect, which had in the meanwhile turned itself round, deliberately devouring its own tail half!—*Taschenberg, Wirbellose Thiere.*

ABILITY OF AQUATIC INSECTS TO SUSTAIN SEVERE COLD.—I have an insect aquarium placed in a window with a northerly exposure, and during the late frost, from December 26th to 29th, the water in it was converted into a solid block of ice, and its inhabitants, a few beetles, were completely imbedded in it. As the ice melted, one of them got its body liberated, and was struggling to free its legs, and now they are swimming about as usual, quite lively, and apparently nothing the worse of the severe cold which they endured. The minimum temperature outside was 22°.—*G. S.*

P.S.—Kirby and Spence notice the fact of insects regaining their vitality after being imbedded in ice; but in this instance they retained it while part of the body was imbedded.—*G. S.*

THE HERRING.—I do not know whether you will consider the size of a herring worth recording, but I write a line to say that one was bought at my door the other day which was sixteen inches in length from the nose to the tip of the tail; from the eye to the centre of the fork was twelve inches, and from back to belly straight through was three inches and a quarter. I would have weighed it, but the cook had cleaned the fish before I saw it. Such books of reference as were at hand give the usual length of the herring as from ten to twelve inches. The vendor termed it a "Scotch herring." I am not aware of the existence of a larger species of *Clupea* than *harengus*; Gosse enumerates but four others—*Leachii*, *pilchardus*, *sprattus*, and *alba*, all of which are smaller.—*George Guyon.*

MACROGLOSSA STELLATARUM.—The Humming-bird Hawk-moth was about late last year. I saw one on Nov. 20th, though a cold day, flying briskly about the few remaining blossoms of valerian.—*G. Guyon, Ventnor, Isle of Wight.*



**BEES DESERTING.**—Your correspondent, Mr. W. Balchin, has very kindly forwarded to me, carriage paid per rail, the whole of the combs from one of his "deserted" hives, and wishes me to give particulars of it in SCIENCE-GOSSIP. I have therefore the pleasure of doing so. On examination I find that all the combs are worker brood-combs, and they are not likely to have been used by a queen for *drone* brood. All the brood I have found in the combs have been drone brood, raised in worker cells, and therefore elongated by the bees; for the queen is unable to deposit drone eggs in worker cells, from her great size at the drone-egg period—indeed in the transition cells she cannot deposit; therefore there can be no doubt but a *fertile worker* existed in the hive, and these can only lay drone eggs in very limited numbers in worker cells. These undergrown partially developed queens seldom can be detected from the common workers. These fertile workers are raised frequently in large cells adjoining the royal cells where the walls have been cut down to form a queen's cell, and thus permit the queen to deposit worker eggs in drone cells which are thus raised to fertile workers only. Besides these circumstances, there is a doubt as to the age of the queen which accompanied the swarm; also, when she perished or left the hive, she had evidently finished her first laying, as most of the cells have been used for breeding purposes, except the side pieces, where honey and pollen or bee-bread had been *attempted* to be stored, and a queen's cell left for raising another queen, which has been abortive, but still an attempt made, as it was sealed over, though not in the usual way. Either the queen has never been out after her new settlement, or has never returned to her new locality after her first wedding trip. A similar circumstance occurred last year in my own apiary in a stock of Ligurians two years old, but was headed by a beautiful Ligurian queen, which was hatched on the 21st of July last; but on the 8th of October I found this stock to be queenless, but an abundance of drone brood in drone cells. There were only three worker cells occupied with brood, which on examination proved to be drone brood. On October 18th I examined every comb, and again on the 26th, but was unable to discover the fertile worker. On the 5th of November I introduced a black queen, which was well received, and on the following day appeared quite "at home." On the 8th I found the drone brood all hatched, but on the 14th of November I found the poor black queen turned out dead. On November the 26th I thoroughly examined every comb on both sides, as I shifted it from one hive to another, but could never discover the fertile worker. Dec. 2nd, I found ten drones turned out dead. Here were drone cells, and drones were bred by a fertile worker until October; but on December 5th, although this stock was well stored with honey,

I found all the bees dead, about seven hundred in number: drones and workers about equal in number. There are most curious and interesting facts connected with the honey-bee, and although hives with fixed combs may be the best for producing honey, they do not give us the opportunity of observing the internal arrangement of a hive as those with movable combs, the invention of which is due to an English gentleman (Major Munn), who in 1834, first introduced the bar frame system.—*W. J. Pettitt, Dover.*

**SLOW-WORM.**—A day or two ago I noticed a slow-worm in my vivarium in its twirlings and turnings, arrived with its head just over the spot where its tail was disappearing in the moss. The head immediately plunged in, in chase, and when the tail's tip emerged about five inches distant, the head came out close behind. This kitten-like manœuvre was probably due to its mistaking its tail for a worm.—*G. Guyon.*

**COLE TITMOUSE** (*Parus ater*, Linn.).—This species is generally distributed in Turkey, in Asia Minor, and Europe. Is partial to old woods with clear open bottoms. Is scarce in numbers, and rarely seen in the open country; in the winter is found feeding amongst cypress trees, but always scarce, and searching for its insect food generally in the midst of the cypress. It is very difficult to discover, and not easy to procure. It is also partial to searching amongst decayed leaves for its insect food, scratching and turning them over for its hidden inmates. It makes its nest in holes of trees, holes of walls, and in the ground. It builds early, and its eggs are rarely to be met with in the country. It is a constant resident in Turkey.—*The Levant Times.*

**BEE PARASITES.**—On the 14th of April last I found a wild bees' nest at the foot of a fir-tree. In some of the cells which I opened were yellowish grubs or larvæ. The nest I laid by, to see what they would turn to, and on the 14th of June a number of the honey-moths (*Aphomia colonella*) came out, and in the course of a few weeks I should say fully a hundred issued from this small nest, about the size of a hen's egg. No bees appeared.—*H. C. Leslie.*

**SNIPE FOOD.**—A relative, whose word may be relied on, about the middle of last month killed a full Snipe, and finding the crop very much distended he opened it, and found therein a horse-leech entire and alive. The general food of the Snipe is considered to be small aquatic insects, for the capture of which its long and highly sensitive bill is especially adapted.—*William Cozens.*

**THE PINE BEETLE** (*Hylurgus juniperda*) has committed such ravages on Scotch Firs in some localities, as to ruin the plantations.



## BOTANY.

FOXGLOVE (p. 6).—Surely Mrs. Watney must be aware that the name Foxglove has, in all probability, nothing to do with Reynard, but is rather connected with the fairies, or little *folk*. This derivation is fully borne out by other of its names; *e.g.*, the North-Country name, "Witches' Thimbles"; the Irish, "Fairy-cap"; the Welsh, "Maneg Ellyllyn" (Fairies' Glove); the Cheshire, "Fairies' Petticoat"; and the East Anglian, "Fairy-thimble." Mrs. Watney appears to have overlooked W. Browne's quaint conceit regarding this plant; he describes Pan as seeking gloves for his mistress, and says,—

"To keepe her slender fingers from the sunne,  
Pan through the pastures oftentimes hath runne  
To pluck the speckled Foxgloves from their stem,  
And on those fingers neatly placed them."

It would appear that there are other early references with which I am not familiar, as Phillips (*Flora Historica*) says, "Our early poets notice it under this name (Foxglove) only." Cowley says,—

"The Foxglove on fair Flora's hand is worn,  
Lest while she gathers flowers she meet a thorn."

A bouquet composed of *Ulmus campestris*, Yellow Iris, Foxglove, Elder, and Ferns would scarcely, I think, be either pretty or graceful. If Mrs. Watney is really serious in "wondering whether flowers do suffer pain when rudely torn from their kindred friends to fade and die between leaves of blotting-paper," she may be glad to learn it is generally supposed that they do *not*; indeed, if they did, a sensitive cook might well shrink from the torture which she would be called upon to inflict upon hapless potatoes, carrots, &c.!—*James Britten, Royal Herbarium, Kew, W.*

IVY-LEAVED TOADFLAX.—The instance of what "W. W. S." calls "vegetable instinct" in connection with this plant is interesting, especially as it is evident that the writer gives an account of what he himself has observed. The occurrence, however, is, I fancy, somewhat exceptional. In the Royal Gardens at Kew is a long old wall, on which *Linaria cymbalaria* grows in large masses; but, after most careful observation, I have failed to detect the twisting of the pedicel to which "W. W. S." refers. The beds on each side the wall produce an abundant crop of young plants.—*James Britten.*

VERONICA BUXBAUMII.—Is it worth while to enter in SCIENCE-GOSSIP all the known localities for this plant, which is now so widely diffused? When it has not been previously recorded for a county (as in "R. W.'s" reference), it is worth mentioning; but the multiplication of local records in a magazine like GOSSIP is a useless occupation of space.—*James Britten.*

RARE PLANTS AT TORQUAY.—It has been my good fortune during a brief visit to this delightful place to find a large number of plants of the sweet-smelling Coltsfoot, or Sweet Butter-burr. In the "British Wild Flowers" *one habitat* only is given, and that is, Torquay. I came upon a large plantation of this interesting plant during a ramble through the lanes and by-paths that lead from the Imperial Hotel down to the rocks on the north-eastern bend of Torbay; but ere I saw the plant itself, my olfactory nerves were assailed with its delicate yet delicious odour—a perfume very closely resembling that of Heliotrope,—and I was greatly surprised to find the spikes of flowers so strong and abundant, considering the time of year (Dec. 24th); but the plants were growing under shelter of a number of fir-trees, and were thus partially protected. I, however, found the plant again the day following, on the border of a plantation by the roadside, near Anstis Cove, on the road to Babbicombe. Botanists, and especially those who are lovers or collectors of ferns, will be alike delighted and surprised to hear of the existence of *Adiantum reniforme* in this locality. For many a year I had sought in vain for this rarity, but the only specimen I ever saw in a living state was a small pot of the species in the Fernery at Kew. It was, of course, among the *exotics*; but the plant I found on Christmas Day, which is assuredly *A. reniforme*, was growing in a little crevice in the roof of a cave about six feet in circumference, close to the dangerous zigzag pathway which leads down to the celebrated quarry at Babbicombe Bay. My first impression was that the plant was an undeveloped form of navelwort, for it was quite young, and some of the pretty little fronds were tiny things hardly half an inch in circumference; but upon examination, even without a lens, there was the unmistakable forked venation of a fern, and the true kidney-shaped fronds suspended singly on the little dark stems, declaring, without any doubt, to my admiring gaze the rare and beautiful *Adiantum reniforme*. Let not botanists doubt the fact of the fern being the species I have described; for, although I was very careful not to injure the root, I preserved several fronds of the plant as a memento of one of the most interesting botanical discoveries I ever made. I was scarcely less surprised, about three years ago, in finding the beautiful species *A. Capillus-Veneris* growing in profusion in the most unlooked-for locality,—viz., the roof and sides of the rock near the mouth of the well-known "Giant's Cave" in the St. Vincent Rocks, near the Clifton Suspension-bridge. The surface of the rock was green with the multitudinous fronds of this lovely species.—*W. H. Grattann, Exmouth.*

MAIZE, OR INDIAN CORN (*Zea Mays*).—Much has been written relative to the origin of this useful



cereal, and to its true home. Numerous facts have been brought forward, and imposing authorities have been quoted in proof of its having been brought originally from America; and this is the view which is generally adopted by botanists. In consequence, not only do writers on the geography of plants, almost without exception, point to the New World as the proper cradle of this precious grass, but we even read in Meyer's "Report on the Botanical Proceedings of 1834," the following strongly-worded passage:—"There is not, at the present day, anything more certain in geographical botany than that maize originated in the New World." Meanwhile, and in spite of these positive dicta, the question is not, perhaps, conclusively settled. One thing is certain, that M. Bonafons, after having admitted the American origin of maize, and its acclimatization in Europe subsequent to the sixteenth century,\* has been led, by deeper and more recent researches, to adopt a precisely opposite conclusion. It is in the first chapter of his monograph on the subject that the learned author expresses himself in the following terms (after, it should be added, having gone thoroughly into the matter):—"It is certain, as numerous historians bear witness, that the maize was in cultivation in America when the first Europeans landed on its shores, towards the end of the fifteenth century; but it seems to be equally certain that this cereal was widely cultivated in India *at an epoch prior to this*. The treatise on Natural History written by Li-tchi-tchin, in the middle of the sixteenth century, fixes the existence of maize among the Chinese at a period so near that of the discovery of the New World, that it is impossible to attribute the introduction of the plant into Asia to that event. Finally, the maize found at Thebes in the coffin of a mummy, by M. Rifaud, in 1819, after a repose of thirty or forty centuries, is a precious but unique relic, which proves its existence in Northern Africa at a very early period.† These points once admitted, we may conclude that Indian corn was known to the ancient world before Columbus sailed to America; that it is not impossible that the Arabs or the Crusaders were the first to introduce it into Europe; and that, at a later period, the discovery of the New World led to fresh importations of this cereal and to a more extended cultivation, which was probably before this confined to very narrow limits."—*P. Decaisné* (Dict. d'Histoire Naturelle).

CAMPANULA ROTUNDIFOLIA takes its specific name of "round-leaved" from a few of its lowest leaves being of that form, but which generally wither and fall off before the time of flowering. Should a person not be acquainted with this circum-

stance, he may think it strange that the plant should be called *round-leaved*, when he sees on it no other leaves than extremely long and narrow ones. There is, however, a variety, found growing on mountains, with very differently-shaped leaves. Botanizing on Ben Lawers last July, my companion met with a very curious plant of this kind: [its stem-leaves were quite as broad as those of the common daisy; it had only one flower, and this, instead of hanging on a slender stalk, and being moved by every passing breeze, stood bolt upright. But the most strange departure from the common form was, that another stem rose from the midst of the flower, two or three inches high, which, with its curving leaves, very much resembled a palm-tree in miniature. Had such a plant been found in fairyland, it would have formed a fitting shade under which Oberon might have pitched his royal tent. At first sight of so very strange a form, it would not have been so very unreasonable if the discoverer had entertained a hope that his name might descend to posterity as one who had found a new *genus*; but, alas! it was only a *monstrosity*.—*R. W.*

JOURNAL OF BOTANY.—A new issue of this journal is announced. It is to be reduced in price to 12s. per annum to subscribers, who are requested to forward their names and a year's subscription to the publishers, Messrs. Taylor & Co., Little Queen Street, Lincoln's Inn Fields, W.C. The characteristic feature of the new issue is to be the greater prominence given to British botany; everything of interest relating directly or collaterally to the British flora is to find a place. Dr. Trimen and Mr. J. G. Baker are to superintend this portion of the work, and other leading British botanists have promised their assistance. We hope that our botanical readers will come forward to support the only magazine especially devoted to their interests.

PHRAGMITES COMMUNIS, *Linn.*—I have met with the form of this plant described by "R. W." as occurring at Southernness, in several localities, maritime or otherwise, notably a few years since on the undercliff above the Smallmouth Sands, Dorset, where I have seen aerial stoboles in lengthfully equaling Ray's "30 pedes longum." Many erect flowering stems arose amongst the ones there prostrate, but were stunted and of weakly growth, as far as I can recollect, not exceeding four feet in height. At the time I referred this condition of the plant to defective nutrition, the soil being loose and sandy, constantly slipping on the clay beneath, and supporting but a scant sprinkling of herbage. A sterile tract, however, always furnishes a noteworthy plant or two, and here I collected *Lathyrus Nissolia*, *Linn.*, with other specimens scarcely less welcome.—*Jas. W. White.*

\* "Sur une nouvelle Espèce de Mais."—*Ann. des Sc. Nat.*, vol. xvii.

Scarcely to be relied on.—*W. W. S.*



## NOTES AND QUERIES.

CHRISTMAS PRIMROSES.—While shooting in the Pickwell woods near this place to-day, several primroses were gathered, in places which had been cleared of underwood, and brought under the influence of air and light.—*C. H. B., Hurstpierpoint, Christmas Eve, 1869.*

CRYSTALS IN WASP.—In SCIENCE-GOSSIP for 1868, p. 150, Mr. Lewis, speaking of the poison-bag of the wasp's sting, says there appeared in the internal knot of the bag the crystals of which he gives an illustration. I cannot find them with the polariscope, and I can only perceive a faint outline of the bag. I should feel obliged for information on this point.—*H. W.*

[Mr. Lewis states that *he* saw them; it does not follow that they will always be found under any conditions.—*Ed. S.G.*]

BURGEONING.—On reading a book called "Cometh up as Flower," p. 185, I came across the following passage:—"When next, the hedges burgeoning now, are putting forth their sprouting green." Will any of your readers kindly enlighten me as to the meaning of the word burgeoning? It is not North country.—*R. Y. G.*

POTATOES.—In answer to your correspondent, R. T., *M.A.*, Notes and Queries, January, 1870, p. 21, I beg to send an extract from Gerarde's Herbal, 1597, p. 926:—"The Potato roots are among the Spaniards, Italians, Indians, and many other nations, ordinary food and common meat; which no doubt are of mighty and nourishing parts, and do strengthen and comfort nature; whose nourishment is as it were a mean between flesh and fruit, but somewhat windie; yet being rosted in the embers, they lose much of their windiness, especially being eaten sopped in wine. Of these roots may be made conserves no lesse toothsome, wholesome, and dainty, than of the flesh of Quinees, and likewise those comfortable and delicate meats called in shops Morselli, Placentulæ, and divers other such like. Their roots serve as a ground or foundation whereon the cunning confectioner or sugar-baker may work and frame many comfortable delicate conserves and restorative sweet meats. They are used to be eaten rosted in the ashes. Some when they be so rosted infuse and sop them in wine: others, to give them the greater grace in eating, do boil them with prunes, and so eat them; likewise others dress them (first being rosted) with oil, vinegar, and salt, every man according to his owne taste and liking. Notwithstanding, howsoever they be dressed, they comfort, nourish, and strengthen the body, vehemently procuring bodily lust."—*J. T. B.*

"STUDIES FROM THE ANTIQUE."—To persons who have a natural respect for their forefathers, there can be no satisfaction in casting ridicule upon bygone generations. Mr. Clifford's paper in the January SCIENCE-GOSSIP can only be repulsive to such persons. If the professed naturalists of the present day were not more advanced than those of the last century, it would indeed be *discreditable* to them; but there is no credit due to them for their advancement. Natural history, like other sciences, has progressed gradually. Our fathers laid the foundations, and we are slowly building the superstructure. To suppose that the naturalists of the

last century should have been as proficient as those of our own times, is to suppose that, like Swift's schemer of "The Flying Island," they should have invented a method of building houses by commencing with the roof. Far from boasting of the spread of exact knowledge among scientific naturalists, I think we might justly feel humbled at the crass ignorance of natural history subjects among people in general. Let any one who doubts this spend a day at the Zoological Gardens, and note the comments made by the visitors on the animals. He will hear Cranes called Vultures; the pair of black American Turkey-Buzzards called Crows; the tongues of the snakes almost invariably called their "stings"; the most ordinary British birds and animals supposed to be of some foreign species; and so *ad infinitum*. So many districts which, until the introduction of railways, were rural, are now thickly populated, so vast a proportion of our population is now engaged in trade and manufactures, that people are gradually becoming utterly unacquainted with the very commonest rural sights and rural sounds. Instead therefore of indulging a vulgar ridicule of the mistakes of the old naturalists, let botanists gratefully acknowledge how much they owe to Ray; ornithologists and zoologists to Willughby and Pennant; and naturalists generally to good old White of Selborne. By all means let modern writers avoid the mistakes of such authors, but let them also aim at emulating the ardent yet unaffected piety and love of the Creator, as well as of His works, so conspicuous in the writings of Izaak Walton, Ray, and many other old English authors, and, alas! so conspicuous by its absence in those of most authors of the present day.—*W. B. Tate, 4, Grove Place, Denmark Hill.*

ORCHIS HIRCINA.—Has any reader of SCIENCE-GOSSIP found this plant during the last two seasons? A botanical friend and myself have made several searches in the old localities to no purpose.—*R. T., M.A.*

THE COLOUR OF FLOWERS.—The colours which the Creator has given to flowers are as rich as they are varied: nor are they distributed at random, but are always in harmony with the temperature of the region in which they are produced, and with the season of the year in which they unfold. "Of all the colours," says Bernardin de S. Pierre, "white is the one best adapted to reflect the heat, and it is that which, speaking generally, Nature has bestowed on flowers opening in cold seasons or cold situations; such as the Snowdrop, the Lily of the Valley, &c. We must add to the white those which have a pink or light blue tinge, as some hyacinths, and those that are yellow—the Buttercup, Dandelion, and Wallflower. But flowers which open in warm spots and seasons—the Corn-flower, the Poppy, &c., which appear in harvest time—enjoy very pronounced colours, such as purple, red, and blue, which absorb the heat, radiation being reduced to a minimum. I do not know of a single purely black flower; for petals without the quality of reflexion would be useless." The same writer remarks also, with much reason, that the form of the corolla is equally adapted to reflect the heat; that it is, in fact, like a mirror placed in front of a fire.—*Jules Macé, La Vie d'une Brin d'Herbe. 1869.*

SNAKE SKIN.—Would you inform me how to soften the skin of a boa constrictor that has been dried in the sun, preparatory to stuffing?—*Robert Murray.*



FLORAL FINDINGS.—At this dreary season of the year, when, beyond a yellow jasmine, a Christmas rose, and maybe a chance snowdrop or polyanthus, there are scarcely any flowers to be found out of doors, it is refreshing to meet in SCIENCE-GOSSIP with "Floral Findings," and though the opening of the article leads us to expect that these are findings of the summer, and the context shows that they comprise an elm-tree, an elder-tree, a couple of crow-foots, a foxglove, and an iris, these are no doubt pleasant objects to think of and to gossip about. But does not your fair correspondent let her imagination rather run away with her? She says, for instance, of the elm-tree: "A whole page might be filled with its uses; its bark is highly nutritious, and affords a substance called by the chemists *ulmin*," &c. Lindley does not seem to have noticed any of these special virtues in the Elm. He says, "The inner bark of the Elm is slightly bitter and astringent, demulcent and diuretic; it has been used in some skin diseases, but it does not appear to possess any important quality. The substance which exudes spontaneously from it is called *ulmin*; this is also found in the Oak, Chestnut, and other trees, and, according to Berzelius, is a constituent of most kinds of bark." As to this mysterious *ulmin*, a reference to Fownes's, or other recent handbook of chemistry, will show that it is not a substance in any way peculiar to the Elm, nor a substance either of surpassing interest or economic importance. The timber of the Elm is perhaps of less general utility than most that we have, though it has been found useful for boring to form pipes for the conveyance of water; but pipes nowadays are generally made of iron. Though as a "constant reader" I am unwilling to ask for space which would no doubt be occupied by more valuable matter, allow me just to inquire why the sambuca should be supposed to be identical with the sackbut. As there is much uncertainty about ancient musical instruments, I am not prepared to assert even that the sackbut was not a bass fiddle, but the general opinion seems to be that it was a wind instrument, and the sambuca a large harp.—R. H. A.

FLORAL FINDINGS.—Surely Mrs. Watney must have made some mistake in describing the floral treasures of her basket, when she includes *Ulmus campestris* with its "*foliage and fruit in perfection*." I have no objection whatever to her giving to the Elm the "place of honour"; but I cannot help thinking that she has been somewhat imaginative in saying that the foliage and fruit were in perfection at the same time. But I should not have taken so much exception to *this* even, seeing that Mrs. Watney does not say at what time of the year she sat under the tree arranging her basket of flowers, if there were not in the paper itself internal evidence that she had gathered a *summer* nosegay. To say nothing of the "protecting branches" shielding her from the sun, which shows that it must have been pretty warm weather, her basket contained wild Irises and Foxgloves, and neither of these were likely to have been gathered before June (here they both flower late in June or early in July); and elder-flowers are also mentioned, which could not have been out much earlier. Now, as late in the year as June even, it would be very remarkable if elm-trees had not shed their seeds; for the membranous seeds usually drop off, and strew the ground just about the time that the leaves are opening, that is in April or May. At this season a branch of young

elm-leaves with the bunches of winged seeds still attached would be a pretty object; but then, how could it be associated with summer Irises and Foxgloves? Mrs. Watney must certainly have mistaken some other tree for an elm, or she must have discovered a new species which fruits in the summer time. I have had some experience in botany during the last twenty years, but I must confess that I have never yet seen the fruit of *Ulmus campestris* "in perfection." In fact, the fruit seldom, if ever, does come to perfection in this country,—so seldom that nurserymen, in propagating it, adopt the troublesome process of grafting it into stocks of *Ulmus montana*, the Wych Elm. Artists and poets are not always very close observers of natural phenomena, and a botanist sometimes shudders at seeing an autumn picture, otherwise beautiful, marred by the introduction of spring flowers; but in a scientific magazine it is a still greater pity to see facts carelessly observed and loosely described, even though the facts themselves may not be very important ones.—Robert Holland.

CAUSE OR EFFECT.—"Kitton, of Norwich," in his answer to "MacLeod, of Skye" mentions that *Palmella cruenta* has been supposed to be the cause of ague, because it is plentiful in districts where ague prevails; and I think most people will agree with Mr. Kitton that "fungoid growths are much more likely to be the effects than the causes of disease." The mistaken notion of certain plants being the cause of certain diseases, is not confined to the microscopic fungi. There are several plants that are thus connected with the liver-rot in sheep. *Pinguicula vulgaris* is called "Sheep-rot" and "Rot-grass" in Scotland. The *Droseras* also, in Gerard's time, were called "Red-rot" in the North of England, and may be so named still; and *Hydrocotyle vulgaris* is called "Water-rot"; old names for the plant were "White-rot," "Penny-rot," "Sheep-killing Penny-grass," and "Flowk-wort." All these names have been given from the supposition that sheep contract the disease by feeding upon the plants, and the name "Flowk-wort" has been applied to *Hydrocotyle*, because sheep affected with the rot are subject to entozoic parasites upon the liver, known as "flukes." It is well known that wet, boggy ground is favourable to the production of liver-rot in sheep, in fact causes it; and as these plants are conspicuous upon boggy places, they have been associated with the disease, although I am not aware that sheep are ever known to feed upon them.—Robert Holland.

"THE GARDEN ORACLE," 1870. One Shilling. Edited by Shirley Hibberd, Esq., F.R.H.S.—The speciality of this issue is a list of dessert fruits arranged in the order of ripening for the whole year. The sorts adapted for limited collections are marked, and although nearly 400 fruits are enumerated, care has been taken to name only such as are really worth growing for the several purposes for which they are recommended. A few figures of vegetable monstrosities will perhaps amuse those who take an interest in such matters. The lists of novelties and the selections for 1870 are somewhat more copious than usual.

SHEEP.—In the December number of SCIENCE-GOSSIP, p. 283, "H. N." asks if it be true that sheep and goats poison the shoots of hedges upon which they have been browsing. It is quite true that when a twig is broken off by the hand or



bitten off by any animal, it does not throw out shoots as readily as when it has been cleanly cut with a knife; and therefore I take it that the shape of the wound and the irregular surface exposed have something to do with the increased injury. But I think it is also quite true that the bite of a sheep or a goat, or a rabbit or hare, is more injurious than the bite of a cow or a horse; and I cannot give any better reason for this than the one usually given by farmers, namely that the bite actually poisons the plant. It is commonly said that sheep poison young hedges by even rubbing against them. Whether this be absolutely true or not, there is no doubt whatever, that they do much injury to young hedges that are not protected from them. — *Robert Holland.*

BEES.—As Mr. W. W. Spicer's inquiries in the December number of SCIENCE-GOSSIP did not meet with any replies last month, I may perhaps be allowed to mention a circumstance that has come under my own personal observation, and has also been noticed by personal friends of mine, who have been bee-keepers; namely, that when the honey-bee does wander from blossom to blossom, it is invariably to plants of *one family*. Generally speaking, bees do (as Mr. Spicer observed the "humble" bee he watched did) confine themselves during their flight out and home to *one species* of flower, but I believe they invariably keep to the members of one family. Therefore the hive-bees that roamed about "carelessly over a piece of ground, clothed with three or four kinds of flowers," would, I fancy, have been found, had Mr. Spicer noted carefully the different plants they visited, to have observed this law. I have been told by a very good authority on bee-culture, that in a garden where various kinds of bee-flowers had been planted, the wise little insects made a point of selecting those first which afforded the richest honey. The lemon-thyme they are very partial to, and I have seen them go quietly from tuft to tuft, passing by other varieties of thyme which grew in the same border. Well might Virgil say—

"To bees is given the Divine mind."

I could not help being amused at a remark made by a certain bee-master some years ago, in the paper of papers, the *Times*, speaking, or rather writing, of the instinct which guided these insects to *one* kind of flower, for he believed in the "one plant,"—theory. He said it was fortunately ordained "that bees should not wander indiscriminately from bloom to bloom, as the evil effects of such careless flittings would soon be observable in the vegetable kingdom, forgetful, doubtless, himself at the time, of the law which florists have found hold good in hybridizing; viz., that all plants will not hybridize the species of a family of plants, and the varieties which have sprung from the species alone afford new seedling plants.—*H. E. Watney.*

FLORA OF CORNWALL.—I should be much obliged if you could tell me if there is any "Flora of Cornwall," or similar work published.—*G. A. B.*

THE BLACK HOREHOUND (*Ballota nigra*) I have found very attractive to some moths, and along a sandy hedge where it grew in large clumps I have taken *Chærocampa elpenor* and *Porcellus* freely, together with the "tansey shark" (*Cucullia umbratica*), and Silver Y, which last was a perfect pest while collecting, from its abundance.—*Harry C. Leslie, Bexley Road, S.E.*

TO SECRETARIES OF FIELD CLUBS.—I am anxious to collect as much information as possible about Field Clubs, and shall be much indebted to any one who will forward me recent reports of such with any of the following particulars: date of formation, scope of work, publications, number of members, and such other details as may appear of interest. Can any one inform me whether the Berkshire Naturalists' Club still exists? and where I can obtain any report of its proceedings?—*James Britten, Royal Herbarium, Kew, W.*

LOOK TO YOUR PLANTS.—A few days ago, much to my surprise, on looking at a few calceolaria cuttings which I have in my conservatory, I found some of the leaves had been eaten. A slight search revealed the offender, in the shape of a fine green caterpillar about an inch long, but of what species I am not sufficient entomologist to say. Is not this rather uncommon at this inclement season of the year? I may add that the conservatory faces the north and only has heat in it when there is a chance of frost.—*D. J. S.*

PYROLA MEDIA.—Has this plant been observed lately at Stock-Ghyll Force, Ambleside? I could not find it during September, 1869.—*R. T., M.A.*

SPIRAL CRYSTALS.—Can any reader inform me by what means the spiral crystals of sulphate of copper are produced for the polariscope?—*C. C.*

LICHENS.—A handy Catalogue of British Lichens, with their stations and distribution, is just published by the Rev. J. McCrombie, M.A., of Hendon, and will be very acceptable to all Lichenologists.

WOODRUFF (*Asperula odorata*, Linn.).—Can any one explain the meaning of the English name of this plant? In Germany it is universally called Waldmeister, or "Lord of the Wood"; a name which is constantly before the public, this plant forming a principal ingredient in the favourite beverage, Maitrauk. I am particular in calling attention to the German synonym, because I agree with the author of "Word Gossip" in assigning a similar origin to our name of Woodruff, viz. Woodreeve. Now the Saxon "Reeve" is "one having authority": we retain the word in Sheriff; the Shire Reeve—which brings Woodruff very near to Waldmeister in sense. The word has been spelt in numberless ways, from the Woodrowe of old Gerarde to the quaint doggrel:

"W, double o, double d, e,  
R, o, w, double f, e."

What can possibly be the origin of such a grand title—the "Lord of the Forest"—as applied to one of the humblest flowers in the European Flora?—*W. W. Spicer, Havre.*

PERFUMES.—Dr. S. Piesse has placed money at the disposal of the Society of Arts, to offer premiums for perfumes produced from plants in the British dependencies. It is available for seven years. I. is £5 for one pound of otto of bergamot. II. is £5 for an ounce of otto of roses; and III. is £10 for a canister of enflowered butter or fat. Such perfumes to be derived from plants grown for the purpose in Australia, New Zealand, Natal, and of the British West-India islands, or any other British colony or dependency.

GARDENER'S CHRONICLE.—This old-established journal has just commenced a new series, with new type, and increased space for botanical matters, obtained by the discontinuance of the "newspaper" portion.



## NOTICES TO CORRESPONDENTS.

J. P.—Bentall's Botanical Paper is generally most approved. It may be had of Mr. E. Newman, Devonshire Street, Bishopsgate, London.

J. S. W. D.—There are Natterjack Toads in Ireland, but reptiles are certainly rare enough to warrant the old story of St. Patrick. *Why* it is so we do not pretend to know, and will not guess.

W. L. W. E.—*Hypnum tenellum*.—R. B.

J. C. D.—No. 2. *Bryum pseudotriquetrum*, young.—R. B.

A. A.—We will keep the subject in mind. Within a month we shall be able to make some inquiry.

H. T. W.—The shells are—1. *Helix aspersa*. 2. *H. nemoralis*. 3. *H. hortensis*. 4. *H. virgata*. 5. *H. rufescens*. 6. *H. Cantiana*.—E. A. S.

"KINGFISHERS," with no name or address, found its way into the paper-basket—of course.

E. M. H.—It is of no use noticing them now that they are gone.

J. C. G.—You put no address on your notice for Exchange column; hence it would be useless to insert it.

J. T. N.—An old trick, often recorded.

E. E. J.—Curious, very! Was it a young sphinx?

R. H.—M. Nacet's address is No. 17, Rue Ste. Severin, Paris. We are not aware that he has any London agents. His immersion objectives might be obtained through a London optician.

W. D. T.—Poor cats! why should they be worried to death? We think that "Gossip" has done enough to them.

F. T.—Ineligible for insertion in "Exchanges," not being "Objects of Natural History."

E. A. W.—Your query being of individual interest only, you had better inquire of Mr. Pettitt, of Dover.

R. D. K.—At present we know nothing more than the paragraph quoted, nor do we know of a London agent for Foreign objectives.

F. D.—One at a time.

A. B.—1. *Sinapis* (*Diplotaxis*, D. C.) *tenuifolia*, R. Br. 2. *Brassica* (*Sinapis*, D. C.) *juncea*, L. 3. *Neslia paniculata*, Desv. Further particulars regarding the abundance and permanence of the two last would be of interest.—B.

C. A. C.—*Selaginella Braunii*, Baker.—J. G. B.

W. H. S.—Probably *Cystopteris dentata*.—J. G. B.

## EXCHANGES.

NOTICE.—Only one "Exchange" can be inserted at a time by the same individual. The maximum length (except for correspondents not residing in Great Britain) is *three* lines. Only objects of Natural History permitted. Notices must be legibly written, *in full*, as intended to be inserted.

CEYLON FERNS.—Dried specimens, named, for the Ferns of other countries. See Advertisement.—T. W. Naylor Beckett, Dyffryn Dulas, Abergele.

LEPIDOPTERA.—A few specimens of *Colias Edusa* (male), and *G. Rhamni* in exchange for other Lepidoptera (butterflies preferred).—Robert Laddiman, St. Augustine's, Norwich.

RARE PLANTS from the London District, Devonshire, and Cornwall offered for Rare Plants from Scotland and Ireland.—Send lists to Mr. James Irvine, 28, Upper Manor Street, Chelsea.

WANTED.—Two Tenby Beestones for a Nodule of Gault, 4 to 5 in. in diameter, in which 50 Characteristic Fossils are imbedded.—Address, F. D., Post-Office, Faversham.

ALPINE and other Foreign Plants (dried) for the rarer British Species.—T. T., Post-office, Midleton, Cork.

POLYCYSTINA.—Two good mounted slides will be given in exchange for a few Polycystina cleaned, but unmounted; slides of Fossil Infusoria and Diatom Deposit for other mounted objects.—C. E. Osborn, 28, Albert Road, Upper Holloway, N.

SECTIONS of Elephant's Hair (transverse), mounted, and Australian Cotton, mounted for polariscope, for mounted and named Diatoms or Foraminifera.—C. Croydon, 20, Fore Street, Devonport.

MINERALS and British or American L. and F.W. Shells for Foreign or British L. and F.W. Shells.—G. S. T., 58, Villa Road, Handsworth, Staffordshire.

LAVA from Vesuvius and other Geological Specimens, Fossils, &c., from various parts of the world, offered in exchange for Eight good Diatom or Entomological slides, well mounted.—G. Bowen, 95, Hampton Street, Birmingham.

FOR Diminutive Cone of Hemlock Spruce, send an object of interest, or stamped and directed envelope to F. S., Post-office, Rugeley.

MOSES.—*Gymnostomum curvirostrum*, *Encalypta rhabdocarpa*, *Orthotrichum Hutchinsiae*, *Anæctangium compactum*, *Bartramia Halleriana*, *Hypnum atrovirens*, *H. dimorphum*, *H. flagellare*, *H. umbratum*, in exchange for South of England Mosses.—Address, A. Jerdon, Highfield, Melrose, N.B.

RARE BRITISH BIRDS' EGGS in exchange for other rare British Birds' Eggs or British Butterflies.—W. Bowman, Upper Willow Hall, Warley, near Halifax, Yorkshire.

FORAMINIFERA, Fossil, from Chalk, Chalk Marl, and London Clay (unmounted) for good Lepidoptera.—J. Purdue, Ridgeway, Plympton, Devon.

SOUTH AFRICAN BEETLES, for named *Carabidæ* from any part of the world.—Address, H. Becker, M.D., care of E. Layard, Esq., South African Museum, Cape Town.

## BOOKS RECEIVED.

"Scientific Opinion." Part XIV. January, 1870. London: Wyman & Sons.

"The Monthly Microscopical Journal." January, 1870. London: Robert Hardwicke.

"Land and Water." Nos. 206, 207, 208, 209.

"Photographic Facsimile of Tam O'Shanter and the Lament of Mary Queen of Scots, by Robert Burns." Photolithographed by W. Griggs. London: E. W. Allen.

"Microscopic Objects." Figured and Described by J. H. Martin. No. 1. January, 1870. London: Van Voorst.

"Le Naturaliste Canadien." Vol. II. No. 1. December, 1869. Quebec: 8, Rue Lamontagne.

"Geological Essays and Sketch of the Geology of Manchester and the Neighbourhood." By John Taylor. London: Simpkin, Marshall, & Co.

"The Artizan." Fourth Series. Vol. I. No. 1. January, 1870. London: 19, Salisbury Street, W.C.

"Barr and Sugden's Spring Catalogue of Choice Seeds." London: 12, King Street, W.C.

"The Geographical Distribution of Coniferæ and Gnetaceæ." By Robert Brown, F.R.G.S., &c.

"Popular Science Review." January, 1870. London: Robert Hardwicke.

"The Gardener's Magazine." Parts XLVIII. and XLIX. December, 1869, and January, 1870. Conducted by Shirley Hibberd, F.R.H.S.

"Catalogue of Vegetable, Agricultural, and Flower Seeds, &c., for 1870." London: Dick Radclyffe & Co., 129, High Holborn.

"The Canadian Naturalist." Vol. IV. No. 2. June, 1869. Montreal: Dawson Brothers.

"The Useful Weather Guide for the First Six Months of the Year 1870." By Eleanor Rugg Byrne. London: E. & F. N. Spon.

"The Midnight Sky: Familiar Notes on the Stars and Planets." By Edwin Dunkin, of the Royal Observatory. With 32 Star Maps, &c. London: The Religious Tract Society.

"The Garden Oracle and Floricultural Year-Book for 1870." Edited by Shirley Hibberd, F.R.H.S. London: Groombridge & Sons.

"Public Schools of Chicago, President's Report." Reprinted from the Fifteenth Annual Report of the Board of Education. 1869.

"A Monograph of the Siliceo-fibrous Sponges." By J. S. Bowerbank, LL.D., F.R.S., &c. Proceedings of the Zoological Society of London for 1869.

"The Animal World." Nos. 1, 2, and 3. October, November, and December, 1869. London: Royal Society for the Prevention of Cruelty to Animals.

"The American Naturalist." Vol. III. No. 11. January, 1870. Salem: Peabody Academy of Science.

"The Geographical Distribution and Physical Characteristics of the Coalfields of the North Pacific Coast." By Robert Brywn, F.R.G.S.

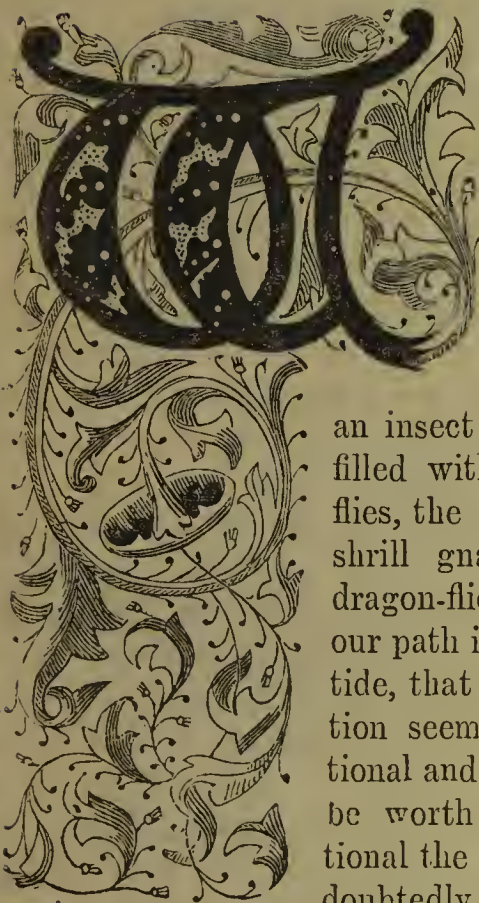
COMMUNICATIONS RECEIVED.—C. H. B.—H. W.—G. G.—W. F. H.—A. A.—R. Y. G.—W. H. G.—J. B.—R. H.—J. S. W. D.—H. H. M.—G. S.—J. S. B.—R. McL.—W. W. S.—L. G. M.—R. T. M. A.—J. P.—T. B.—R. W.—T. T.—W. R. T.—E. G. V.—E. E. J.—E. M.—R. M.—A. L.—C. E. O.—J. P.—G. S. T.—H. E. W.—F. S.—E. M. H.—J. R. S. C.—H. U.—G. B.—A. J.—J. T. N.—H. C. L.—R. H.—H. D.—C. A. C.—G. P. H.—G. A. B.—W. B.—J. C. G.—B.—R. H. A.—W. D.—J. W. W.—C. C.—W. F. H.—F. D.—W. D. T.—W. N. B.—R. L.—D. J. S.—F. T.—G. A. W.—W. C.—J. S. T.—R. D. K.—J. I.—A. B.—W. J. P.—W. W. S.—E. B.—T. Y., Torquay.—S. P.—H. B.





## WINGLESS INSECTS.

BY THE REV. W. W. SPICER, M.A.



WE are so much in the habit of associating the power of flight with the six legs, two antennæ, and other attributes of the insect world; the mind's eye, when we picture

an insect to ourselves, is so filled with the bright butterflies, the droning beetles, the shrill gnats, and the fierce dragon-flies, which flit across our path in the happy summer tide, that the "apterous" section seems to be too exceptional and too insignificant to be worth mention. Exceptional the wingless insects undoubtedly are, but it would

be wrong to say that they are insignificant in point of numbers. Of course, when speaking of the absence of wings, I make no reference to the imperfect insect. Neither in the larval nor in the pupal condition are the means of flying ever found; wings are the sole prerogative of the imago or complete insect; a hint, by the way, which may be of service to beginners in their entomological researches.

In point of fact, every one of the eight orders under which insects are usually ranged by modern systematists, has its wingless representatives.

Take the *Coleoptera*, the Beetles, which are generally placed first in the list, as being the most perfect in their organization and the richest in species. The apterous members of this great order are almost boundless, far too numerous to mention individually. Thus we have the Oil Beetles (*Meloe*), the Bloody-noses (*Timarcha*), a vast number of Weevils (*Rhynchophori*); as *brachyderus*, *strophoso-*

*mus*, and a host of others. The family of Carabini, the fiercest and swiftest of all beetles, supplies us with numerous species in which the wings are wanting. A remarkable member of this family must be *Trichondyla aptera*, to which Mr. Wallace introduces us, as a cicindelid almost exclusively confined to the Malay islands. "In shape it resembles a very large ant, more than an inch long, and of a purple-black colour. Like an ant also, it is wingless, and is generally found ascending trees, passing round the trunks in a spiral direction when approached, to avoid capture; so that it requires a sudden rush and active fingers to secure a specimen." These all exhibit their elytra in a perfect condition, so that to the superficial observer there is no indication of the absence of the organs of flight; for it is a noteworthy circumstance in regard to beetles, that though the membraneous underwings are so often wanting, the horny wing-cases are invariably present. They are often very minute, but they are there for all that.

Again, when of a fine summer's night we see,—

"Among the crooked lanes on every hedge  
The glowworm light her gem, and through the dark  
A moving radiance twinkle,"

we must not forget, that one possible use for which she throws out her phosphorescent lamp, is to attract the attention of the winged male, whom she cannot herself fly to meet, she being a mere grub in appearance, without the trace of a wing, and with very stumpy wing-cases. And here I would observe, as another curious fact in insect history, that, as regards the two sexes, where one is winged and the other is wingless, the deprivation almost invariably falls to the lot of the female. This last remark is well illustrated in the next order, the *Strepsiptera*, or Bee Lice: those singular parasites, which take up their abode between the abdominal plates in certain bees. The species are few and obscure, but in every one, so far as is known, the females are without the semblance of a wing.



Perhaps the last order to which the reader would look for an apterous specimen would be that of the *Lepidoptera*, the gay butterflies and moths; nevertheless they have their share of mutilated females; at least, if the wings are not always wanting, they are reduced to such a rudimentary condition as to be utterly unserviceable. Examples of wingless moths are found in the Pale Brindled Beauty (*Phigalia*), the Belted Beauty (*Nyssia*), the Mottled Umber (*Erannis*), the Searee Umber (*Lamptia*), the Spring Usher (*Anisopteryx*), the Winter Moth (*Cheimatobia*), &c. These all belong to the family of Loopers or Geometrids. The Aretiids supply us with the Vapourer (*Oreggia*); and lastly we have the most curious of all in the Psychids, the Brown Muslin (*Psyche*), the Chimney-sweep (*Fumea*), and the Large Chimney-sweep (*Sterrhopteryx*). Here too we have a phenomenon nowhere else met with, of females, not merely without wings, but without antennæ—nay, more Chinese than the ladies of the Celestial Empire, Nature has forgotten to give them legs, so that they are mere wormlike grubs, which spend all their days perched on the cocoon from which they originally issued.

The next order, the *Hymenoptera*, contains the Ant tribe, among which we find three forms,—the males, which are always winged; the females, winged only at particular seasons and for a limited period; and lastly the workers, or neuters, which are entirely wingless. In another tribe, apparently a connecting link between the ants and wasps, the Mutillids, in which there are no neuters, the females are wingless. *Cynips aptera*, one of the gall flies, the female only of which is known, is also wingless. It is found on moist ground at the foot of oak-trees, on the roots of which it makes provision for its young.

Reasoning *à priori*, one would suppose that an order in which the normal number of wings is two only, is more likely to furnish us with apterous members than those in which four wings have to be disposed of. This, however, is far from being the case; the Dipters, or flies, the solitary two-winged order, being singularly complete as regards their organs of flight. There is said to be one instance—but I know nothing of it—among the true flies, in the person of *Apterina pedestris*, nearly related to *Borborus*, an inhabitant of North Germany; in this insect the wings are rudimentary, and the halteres or balancers indistinct. *Chionea araneoides* is an anomaly, another wingless denizen of Northern Germany, which takes its pastime on the surface of the snow in early spring.

The Fleas and the Louseflies swell the number of apterous dipters; but in good truth they have small claim to the position they occupy. The former (*Aphaniptera*), as every one knows who has tried to catch one, have wonderful legs, but not a pretence to a wing. The latter (*Homaloptera* or *Pupipara*),

all parasitic in their habits, are divided as regards their powers of flight; some, as the forest-flies (*Hippobosca*), darting through the air at a considerable speed; while in the Sheep-tiek (*Melophagus*), the Bat-tiek (*Nycterobia*), the Bee-tiek (*Braula*), and some others, wings are altogether wanting.

Having roughly analyzed the Metabolous section of the Insect Kingdom (or that in which the metamorphoses of larva, pupa, and imago are complete), let us cast a glance at the Ametabola, in which the parents and their young differ but little in general appearance.

It comprises the three remaining orders, the first of which, the *Neuroptera*, contains the important family of Termites, or White Ants: the stages of increase in these animals are not very accurately made out; but it is certain that the females, and also some other individuals, are apterous. Here too we meet with the singular little Boreus, nearly related to our Lobster-fly (*Panorpa*), in which the female is wingless, and the male has the merest rudiments of a wing; also the Psocids, tiny soft-bodied creatures, of which the genera *Atropos* and *Clothilla* are without the means of flying.

The *Orthopterous* order is crowded with wingless members, at the head of which, conspicuous for strangeness of form and singularity of habits, stand the Spectres or Stiek insects of the warmer regions of the globe. Following these are numbers of insects destined never to "cleave the liquid air," far too numerous to mention in detail. The female Cockroach (*Periplaneta orientalis*) has but the first beginnings of a wing. The large families of Spring-tails (*Thysanura*) and Bird-lice (*Mallophaga*) are utterly destitute of any approach to that organ. Of *Apterygida*, a wingless representative of the Earwig tribe; of *Aptinotherips*, which hold the same relation to the Physapods; and of *Batrachotetrix* among the Grasshoppers and Locusts, I know nothing but the names.

Last of all, the *Hemiptera* furnish their contingent, most of them only too well known. I allude to those disgusting parasites, the Bed-bug (*Acanthia*), and the Louse (*Pediculus*), each with a goodly set of relations; the whole "voracious crew" being entirely wingless. Next to these we have the Plant-lice (*Aphids*), which are wingless under certain circumstances; and finally the Scale insects (*Coccids*) of which the males alone are provided with wings, and these are reduced to two.

*Havre.*

---

FLORA OF CORNWALL.—Mr. J. W. N. Keys is publishing a Flora of Devon and Cornwall in the "Transactions of the Plymouth Institution and Devon and Cornwall Natural History Society." It is at present published as far as *Scrophulariaceæ*.—James Britten.



OCCURRENCE OF THE SPUR-WINGED  
GOOSE IN WILTSHIRE.*(Anser gambensis, Briss.)*

SOME inaccuracies about locality, &c., having crept into a brief newspaper paragraph announcing the occurrence of the Gambo, or Spur-winged Goose, in Wiltshire, I am now enabled, through the kindness of friends, to furnish you with more correct particulars concerning the reappearance of a specimen of this very rare visitor.

A gentleman who resides at the Manor Farm, Upavon, and not, as erroneously stated, at "Charlton Farm," or "Netheravon," had noticed from his window a large strange-looking bird beside a pond near the homestead, in company with his tame geese. Surprised to see how amicable it was with his own birds, and curious to ascertain what it could be, he went out, hoping to get a closer view of it, when suddenly it took wing, alighting again in a meadow not far off. Seeing enough to convince him that the bird was very wild and very peculiar in appearance, and not wishing to lose it altogether, he returned for his gun, and succeeded in shooting it. Fortunately it was sent for preservation to a "naturalist" living in Devizes, and to him I am indebted for the following account:—"This bird," he writes, "was in excellent plumage and in very good condition, and was, I believe, a two-year old bird, or its back plumage would have been of a black hue, whereas it was mottled with grey; when walking, its gait was very upright, more so than our tame geese, and its legs are longer. The spur upon its wings is about three-eighths of an inch long; and I found, upon examining the contents of its stomach, that it had been feeding upon corn and vegetable substances. It weighed four pounds one ounce, was twenty-seven inches in length, and four feet two inches in breadth. According to the instructions received, I stuffed it in an upright position, just as it had been seen when alive."

On the authority of Sir William Jardine, I find that the Spur-winged Goose was introduced into our Fauna upon a single specimen killed in Cornwall in June, 1821, presented to Mr. Bewick, serving for the figure in his Water-birds, and now deposited in the Museum at Newcastle-upon-Tyne. This Cornish bird had been seen for several days near a small fishing-place (St. Germain's, I believe), and, like our gregarious Wiltshire bird, associated with the common geese at a farm in the vicinity, and was much disturbed before being finally shot. Bewick describes this specimen as follows:—"The bill is reddish-yellow, with a jointed protuberance at the base of the upper mandible; the upper parts of the head and neck are dingy brown; the auriculars and sides of the throat white; sides of the breast and of the upper plumage appear black, but their colour is

lost, particularly in the scapulars and tertials, which are most resplendently bronzed and glossed with brilliant green, and most of the outer webs of the feathers partake of the same hue; on the bends of the wings or wrist is placed a strong white horny spur, turning upwards, about five-eighths of an inch in length, and pointing rather inwards; the whole of the edges of the wing, from the alula spuria to the elbow and shoulder, are white; all the under parts the same."

The second Spur-winged Goose of which we have an account was killed about the middle of February, 1855, near Banff, N.B., as recorded in the *Naturalist* for August in that year, by Mr. Thomas Edwards, of that place: it was a companion of domestic geese at a farm. The late Mr. Bennet has left us a very careful description of one kept in the gardens of the Zoological Society, London: he alludes to the rarity of this species in our collections, notwithstanding its early introduction into this country, and considers it difficult to acclimatize in the north of Europe. The Gambo Goose was confounded by Willughby, and afterwards by Buffon, with a variety of the Egyptian Goose—a bird also said to be armed at the carpal joints with tubercles or spurs, visible only when the wings are expanded, being concealed at other times beneath the plumage. What the uses of these spurs are we know not; but their situation would lead us to infer that they may assist the bird in defending itself when attacked by enemies, and, probably, may serve as "fenders" to protect the wings from undue friction when forcing its way through the dense aquatic vegetation so characteristic of African rivers. I am not aware that anything is known about the nidification of the Spur-winged Goose, or that its egg has ever been described. Swainson considers it as a rasorial type. Our Wiltshire specimen was killed on the 4th of September, 1869, and is now in the possession of the gentleman occupying the Manor Farm, at Upavon.

Bainton House, Reading. HENRY MOSES, M.D.

## HINTS ON PRESERVING LARVÆ.

BY H. PRYER.

SOME two years ago, seeing some preserved larvæ in the possession of Mr. Bond, I became desirous to know the method by which they were prepared; and, after a good many experiments, I attained success. Believing that there are many others who would like to be informed of the *modus operandi*, I have pleasure in giving them the result of my experience, as follows:—

Having procured a larva, immerse it in a solution of alum or pyroligneous acid for a short time; then gently squeeze the inside out, upon or between pieces of blotting-paper, taking care not to tear or



enlarge the anal orifice. After having extracted all the moisture and intestines, insert in the aperture a bent glass blow-pipe, having a bulb in the middle, and inflate the larva over a spirit-lamp, having a flat piece of zinc fixed over the flame. Holding the tube so that the larva does not touch the zinc plate, blow gently, until it is quite dry and hard. This requires great care, as it is liable to scorch; and, if the skin be only partially dry, it will, although apparently finished, become indented or depressed in those places where it is not thoroughly hardened. To ascertain if the operation be complete, cease blowing, and draw in the breath gently; when, if the larva is not dry, it will shrivel up, and must be inflated again immediately; if, on the other hand, it is dry, it will remain distended to its natural size and appearance. To prevent the head from being extended too much, dry all the body except the first and second segments, take the larva away from the spirit-lamp, and press the head into its natural position, afterwards drying it at some distance from the flame, without blowing through the tube. If the larva require colouring (as almost all green larvæ do), some very finely powdered dry colour (rather darker than the original colour of the larva) must be introduced into the skin after it is thoroughly dry. To get the colour evenly on the inside of the skin, it must be rolled about in the hand. In order to direct the heat on to any particular place, a small hole (about the size of the head of a pin) should be made in the centre of the piece of zinc. This will be found to be particularly useful, when finishing the head of the larva, as above described. The object of having the glass tube bent is, that the head is then above the level of the flame; and the bulb is to prevent any moisture from the mouth running down the tube into the inside of the larva. I generally put a piece of blotting-paper in the mouth-piece of the tube.

The inflation while the larva is over the lamp must be kept up without intermission. This is very easy after a little practice, and does not cause any exertion, as the breathing is carried on through the nose.

A larva should be kept without food for a day before being killed, as it is almost impossible to extract the food that it has just eaten; and, after the larva is dried, this shows in an ugly black patch just behind the head.

Very frequently it occurs, that, while blowing, the larva will slip off the tube; this can be prevented by tying a thin piece of cotton round the end of the tube and the last pair of claspers. It is, however, as well, if possible, to dispense with tying the larva on the tube, as it very often distorts the shape of the last segments.

The best larva for a first experiment is one that has no bright colours and is not hairy; such as *Noctua xanthographa*.

The reason for putting the larva in pyroligneous acid or a solution of alum is to harden the skin, so that it may not be inflated too much; and, if hairy, to prevent the hairs from falling out whilst being handled.

When preserving a brightly-coloured and hairy larva, such as *Bombyx Neustria*, I generally starve it until it is nearly dried up, and then kill it and take the inside out. In conclusion, I would remark that some amount of patience is requisite to ensure success. Any further particulars or explanations that may be required I shall be most happy, if possible, to afford. — *Entomologist's Monthly Magazine*.

### ON POLLEN.\*

BY CHARLES BAILEY, ESQ.

HAVING recently examined the pollen of several thousand species of plants, I am led to think that the characters presented by these grains might prove useful as a means of differentiation in allied species; my researches, however, have not been sufficiently extensive to form any positive conclusions; but as leisure permits I hope to prosecute the subject further. In the meanwhile the following notes are thrown out as indications of some of the more noticeable distinctions to be drawn from a careful comparison of these organs, and they may serve to draw the attention of others to the matter.

There are four points, in one or other of which pollen-grains of plants belonging to the same genus may be found to differ from each other; viz., form, markings, dimensions, and colour.

1. FORM.—It has long been noticed that certain types of pollen are characteristic of the natural order to which the plants which produce them belong; as for instance, the peculiar pitted polyhedral pollen of the *Caryophyllaceæ*, the spherical spiny pollen of the *Malvaceæ*, the large triangular pollen of the *Onagraceæ*, the peculiar pollen of the *Coniferae*, or the elliptical pollen of the *Liliaceæ* and other nonocotyledonous orders; in fact, most orders possess a type sufficiently marked to be characteristic of each. This statement, however, must be accepted with limitations; the *Compositæ*, for instance, have three or more well-marked types, represented by the beautifully sculptured pollen of the Chicory, the minute oval spiny pollen of the Asters, Calendulas, Cacalias, &c.; and another form wholly destitute of spines, as in the *Centaurea scabiosa*. There are, besides, other natural orders where similar variety occurs.

But differences of form are met with in plants of the same genus, by which the one species or the

\* Read at the Literary and Philosophical Society, Manchester, Dec. 28th, 1869.



other is readily marked off by its pollen; thus the pollen-grain of *Anemone sulphurea* is roundish, but that of *Anemone montana* is elliptic; the pollen of *Aronicum Doronicum* is much more elongate than that of *A. scorpioides*; and while the grains of *Ranunculus philonotis* are round and yellow, those of *R. platanifolius* are elliptic, white and smaller.

2. MARKINGS.—Here again there is endless diversity, and a boundless field lies open for the researches of tired-out dot-and-line hunters of diatom valves. A few instances only of the more striking differences can be given here.

The pollen of the *Geraniaceæ* and *Campanulaceæ* is for the most part globular; but while some of the grains are quite smooth, others are covered with spines; thus the pollen of *Campanula media* has a number of short spines sparsely scattered over the surface of the grain, but *C. rapunculoides* is wholly destitute of them. In other plants these spines are replaced by tubercles, and both spines and tubercles vary greatly in length and number; for example, in *Valeriana tuberosa* the spines are only half the length of those on the pollen of *V. montana*, the grains being also slightly smaller. The pollen of the *Liliaceæ* is often covered with a more or less prominent reticulation, which is subject to much variation: compare, for example, the coarse network which invests the pollen of *Lilium croceum* with the finer reticulation of *L. canadense*, the grains of the latter species being much more globose and smaller.

3. DIMENSIONS.—Some instances of the differences observable in the size of pollen-grains have already been published by Professor Gulliver, whose measurements of the pollen of various species of *Ranunculus* show the help that may be derived from this character; *R. arvensis* is nearly twice the size of *R. hirsutus*, their dimensions being respectively  $\frac{1}{470}$  and  $\frac{1}{888}$  of an inch.

I have not had the time to make similar careful measurements with the micrometer, but I have seen sufficient to be satisfied that while there is considerable variation in dimensions between the pollen of one species and that of another, they are tolerably constant in size in the same species.

For some noticeable differences compare the smaller pollen of *Epilobium brachycarpum* with the larger pollen of *E. Fleischeri* or that of *Senecio gallicus* with *S. incanus*, the spines on the latter species being also much coarser. Again, the pollen of *Silene acaulis* is but half the size of that of *S. alpina*, the latter having some beautiful markings in addition: the pollen-grains of this genus differ from the usual caryophyllaceous type in not having the pits or depressions common in the order, so that the grains become spherical rather than polyhedral.

4. COLOUR.—This is not so reliable a character for differentiation as the others noticed, since species differ amongst each other according to the

soil, &c., of the place where they have grown. I remember gathering, some years ago, near Ashbourne, Derbyshire, a variety of *Stellaria Holostea* having a dark purple pollen instead of the ordinary pale yellow. An example or two under this head will suffice.

The pollen of *Ajuga genevensis* is yellow, but that of *A. pyramidalis* is usually white; again, while the grains of *Ornithogalum umbellatum* are large and yellow, those of *O. nutans* are small and white.

Some objection may be raised to any reliance being placed upon the dry shrivelled-up grains of herbaria specimens, such specimens being in most cases the only ones obtainable for purposes of investigation; but the structure of pollen is such as to bring into greater prominence the pores, folds, valves, and other markings which are met with on their surface after the grains have collapsed by the discharge of their contents.

In regard to the mounting of these objects for the microscope, they show to the best advantage when put up perfectly dry: the cells should be sufficiently shallow to admit of no more than a single layer, and at the same time deep enough to permit the grains to move about. If pollen is mounted soon after it has been discharged from the fresh anthers, the fovilla is apt to condense on the covering glass, and the slide soon becomes useless. The stamens taken from an unopened flower-bud furnish the best and cleanest pollen, and these should be selected in preference to those taken from the fully-developed flower.

Canada balsam, glycerine, and other media are occasionally helpful in making out structure; thus the pores of *Campanula rotundifolia*, *Phyteuma Halleri*, and other allied species, are made much more distinct when mounted in balsam.

## FLORAL FINDINGS.

HAD you allowed my little introductory note to appear when you published "Floral Findings," the Pylades and Orestes of SCIENCE-GOSSIP could not have attacked me.

I also find that a third valiant knight of the quill takes up his pen this month to shoot hard words at me. Fy, gentlemen, fy; go find "a foeman worthy of your steel."

All I can say is, that I fear the trio are sadly wanting in the gift they credit me with,—"imagination," or else they must have caught my meaning at a glance. I never thought that any one could suppose I intended to say that I had gathered the plants contained in my flower-basket at this season of the year, or had really arranged them in a real vase.

It has long been a habit of mine to bring home a bunch of "Floral Findings," sort them at leisure, and jot down all I know or remember reading about



them, making a little note of each specimen. It was one of these jottings, made in June, that I sent you, sir, together with a note of explanation. As *that* note did not appear, I feel sure you will, with the courtesy you always show the weaker sex, permit *this* to do so.

The tree I sat under was the *Ulmus campestris* of our woodlands, although growing in cultivated soil, and the ground at the time (the first week in June) was covered with ripe fruit; there were some clusters still on the tree when I wrote the words "foliage and fruit in perfection," which have been taken up so warmly, and I contend that the term was not misapplied: the green leaves afforded me shade; so, to say the foliage was in perfection could not be far wrong; and to term ripened seed in a stage of "perfection" must surely be right.

The Elm, I know, is apt to produce suckers, so people graft it on the Wych Elm; and Mr. Holland will pardon my telling him he is mistaken in calling this "process" a "troublesome" one. No tree is more easy to graft; nearly every scion takes. The Wych Elm flowers in May, and the seeds ripen in June. It seeds more freely than the *Ulmus campestris*, and when stocks are wanted, it is absolutely requisite to sow seed.

If "R. H. A." had lived as much in the country as I have, he would not look in any book for a record of the "utility" of the Elm. His own eyes would assure him of the fact: axletrees in the village wheelwright's shop will tell him of it; chairs and tables at the carpenter's will point it out to him; his garden wheelbarrow and his farmyard cart are practical evidence, provided he live in a neighbourhood where the wood is come-atable; and, last of all, the humble coffin carried home after dusk by sorrowing friends to some wayside cottage is generally made of Elm wood.

Boat-builders will testify as to its value, and joiners find it acquire a fine mahogany colour in their hands by applying some particular acid to it.

De Villette made good brown paper from its bark, and Dambourney obtained a fine yellowish-brown dye from the same source. Drs. Lettsom, Lysson, Prout, Willan, and Banau all laud its medicinal virtues. I have seen it used with good effect by the poorer classes in various cases, which, as I am not a member of the profession, or writing in a medical journal, need not be recorded here.

Will "R. H. A." tell me *why* the Sambuca should not be identical with the Sackbut? I will tell him *why* people fancy it is. The Elder-tree is said to have been used in the construction of the sackbut, and *Sambucus*, the Latin name for the Elder, comes from *Sambuca*, a musical instrument.

And now what remains to be explained? I am, as Mr. Britten opines, aware that the English is the *only* language in which the *Digitalis* is called *Foxglove*;

also that some surmise the proper orthography to be "*Folksglove*"; but I believe it came from *Fuchsglove*, for Fuchs was the first to give it the name of *Digitalis*, from *digitale*, the finger of a glove; and we English may quite as easily have corrupted *Fuchsglove* into *Foxglove*, as *Folksglove*. The German appellation of *Fingerhut* (fingerstall) is supposed to have suggested the term *Digitalis* to Fuchs.

I am indebted to Mr. Britten for his endeavour to set my mind at rest in regard to the sensibility of plants. I was, I must confess it, in a fanciful mood when I wrote the words he quotes. Walter S. Landor's lines—

"It is, and ever was, my wish and way  
To let all flowers live freely, and all die  
Whene'er their genius bids their souls depart,  
Among their kindred in their native place.  
I never pluck the Rose, the Violet's head  
Hath shaken with my breath upon its bank,  
And not reproached me; the ever sacred cup  
Of the pure Lily hath, between my hands,  
Felt safe, unsoiled, nor lost one grain of gold,"

were sounding in my ears, and I thought of that dear, good, noble lady, the late Duchess of Sutherland, who never liked *cut* flowers to decorate her princely rooms. A near relative of mine, who often stayed at both Cliefden and Lilleshall, has frequently spoken to me of this sensitiveness on her Grace's part, and repeated her words, "Do not *cut* them, Comtesse H——, bright, beautiful things; let them live out their brief existence." A lady, still higher in rank, and more beloved if possible, shares, I hear, in this feeling respecting cut flowers. Will Mr. Britten think less harshly of fanciful people when he finds such good precedents for indulging in poetical conceits? and if he reads my "Floral Findings" over again, he will discover that I never said that I placed any elm in my bouquet; I simply described the tree under whose protecting branches I sat. Ah, well, I fear his matter-of-fact Dobin carries him as wide from the mark, sometimes, as my Pegasus does. HELEN E. WATNEY.

Upper Norwood, Feb. 4.

OTTER AND BADGER.—Almost every year one or more of the former are met with in some part of the course of the Avon, and it is not long since a wild-fowl shooter killed one whilst waiting in ambush for a flock of ducks. This specimen was about half-grown, but on previous occasions I have seen some very large ones which had been captured in this neighbourhood. I have heard of the Otter being occasionally found in the brooks of the forest, but I have never *seen* a specimen from that locality. The Badger is still a native of the forest, but is, I believe, becoming gradually scarcer. I have a fine old female which was caught in a trap on the border of one of the woods a few years ago.—G. B. C., Ringwood.

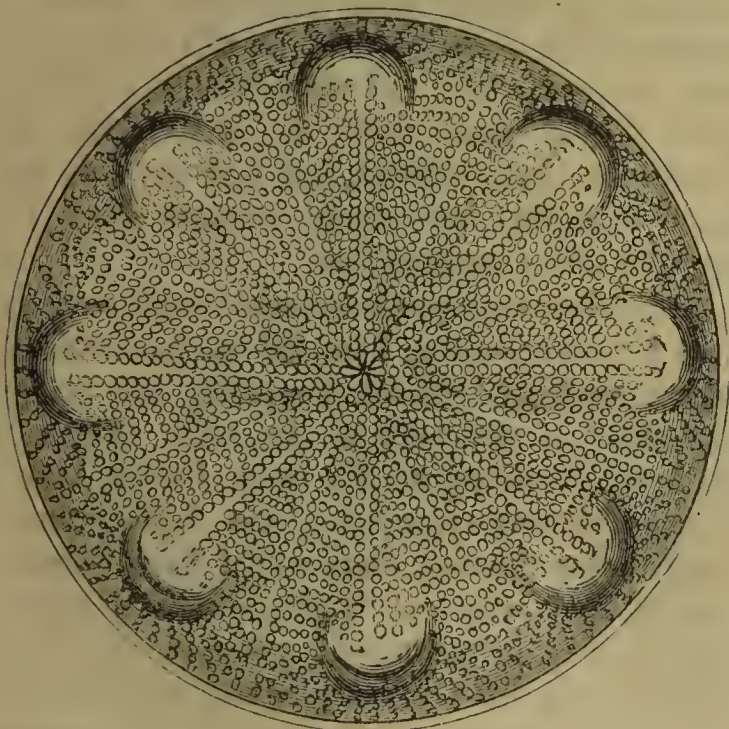


## GUANO DIATOMS.

AFTER all that has been written of late against the very extensive, and too exclusive, study of the Diatomaceæ prevalent amongst microscopists, and considering the prejudice which to some extent evidently exists against the study, on account of the supposed undue share of attention which it has received, it is not without some hesitation that I venture to contribute a paper on diatoms. And this hesitation is not lessened by the fact that I have to make some remarks on the so-called "fossil diatoms" and some of their unusual forms, of which, when no living examples of similar kinds have been found, doubts are entertained whether they should occupy any position whatever in the scientific classification of the Diatomaceæ.

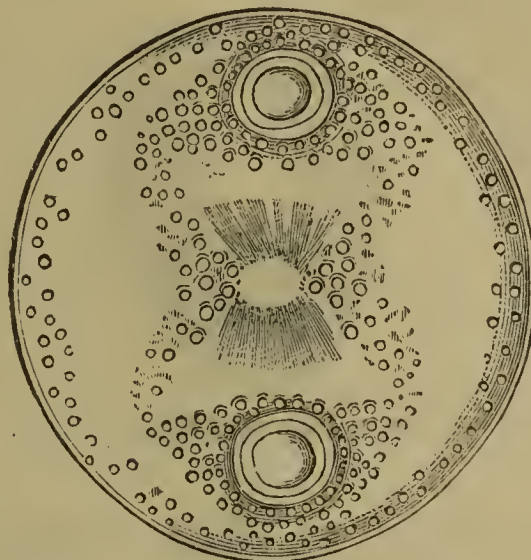
For some time past, during the leisure time at my disposal, I have made extended examinations of guano, and I have prepared many slides, by the method of selection, of which there is a description in SCIENCE-GOSSIP, vol. i., and a further account in the second number of the *Monthly Microscopical Journal*. Perhaps an account of some of the results of my search may contribute to Microscopical Recreation, if not to "Microscopical Research."

In common Peruvian guano, besides the forms usually met with, I have found two specimens of *Aulacodiscus Kittoni*, a form, according to Pritchard, usual in New Zealand and Monterey Bay, and fossil in Monterey stone. I notice that in my specimens the row of marginal dots given in the figure by Pritchard is entirely wanting (fig. 52).

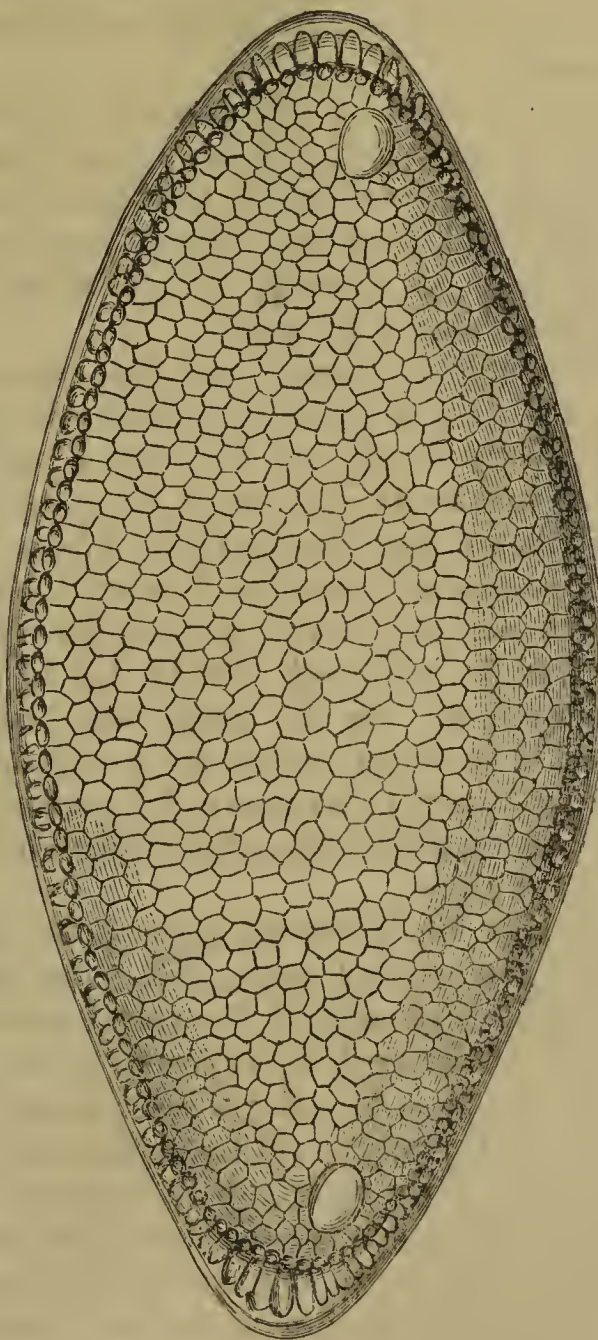
Fig. 52. *Aulacodiscus Kittoni*,  $\times 350$ .

I have also met with two very interesting and perfect specimens of an *Auliscus*, which I suppose to be new. The accompanying figure will give a clear idea of the form and markings of this diatom. The species to which it bears the closest resem-

blance is, I think, *Auliscus racemosus* (*Microscopical Journal*, vol. iv., new series); yet the difference of structure is greater than that usually required to mark a distinct species (fig. 53).

Fig. 53. *Auliscus*,  $\times 350$ .

Another form, which I take to be one of the valves of a large *Biddulphia*, is also worthy of notice (fig. 54).

Fig. 54. *Biddulphia*, sp.,  $\times 350$ .

There is yet another example of singular forms to which I would direct attention. It is a diatom,



small, elliptical, very convex, and it has one large process nearly central. From this process to the margin it is marked by fine striæ, which cannot easily be explained by figure (fig. 55).



Fig. 55. Diatom from Guano,  $\times 350$ .

The study of the minute markings of some diatoms has proved of essential service to the progress of microscopy. Diatoms have afforded tests for the best methods of illumination by transmitted light, and the various accounts of their structure that have been recorded, and afterwards have been proved to be erroneous, teach valuable lessons of the necessity for caution in the interpretation of appearances.

In the number of the *Monthly Microscopical Journal* for December, it is more than hinted that *Aulacodiscus orientalis* of Dr. Greville is but one of the plates of *A. oregonus*. This statement suggests the necessity for a careful re-examination of many of the disk forms of diatoms.

I have been accustomed to select diatoms with the aid of a simple microscope, and a glass of about an inch focal length, and very often I have taken *Aulacodiscus scaber*, and turned it on its side, so as to give the front view, and then I have brought down the needle, with which I select the diatoms, on the broad hoop, so as to separate the two valves, that I might have both side by side to compare their structure. In the front view, one valve seemed to be convex and the other quite flat, and I am led to doubt the constancy of the apiculi, which have been considered characteristic features in this species of diatom.

Again, as Mr. Kitton has observed in the *Microscopical Journal* for January, 1868, "the absence of the margin is an accident of frequent occurrence." This can be observed in the case of *Arachnoidiscus ornatus*, for it is in a single case only out of very many that the margin will be perfect, and the imperfect specimens could only be remarked by comparison with a complete specimen that may sometimes be found. In this diatom, also, interesting although unimportant variations and imperfections may frequently be observed in the umbilicus. A great number of specimens may be obtained from some samples of Ichaboe guano, and from them an opportunity may be found for examining the dif-

ferent plates of the diatom, and the peculiarities of their structure.

In an example of *Navicula lyra* which I possess, there is a singular contortion in the markings of the upper valve, and a difference of structure in the valves themselves, which is very apparent and very

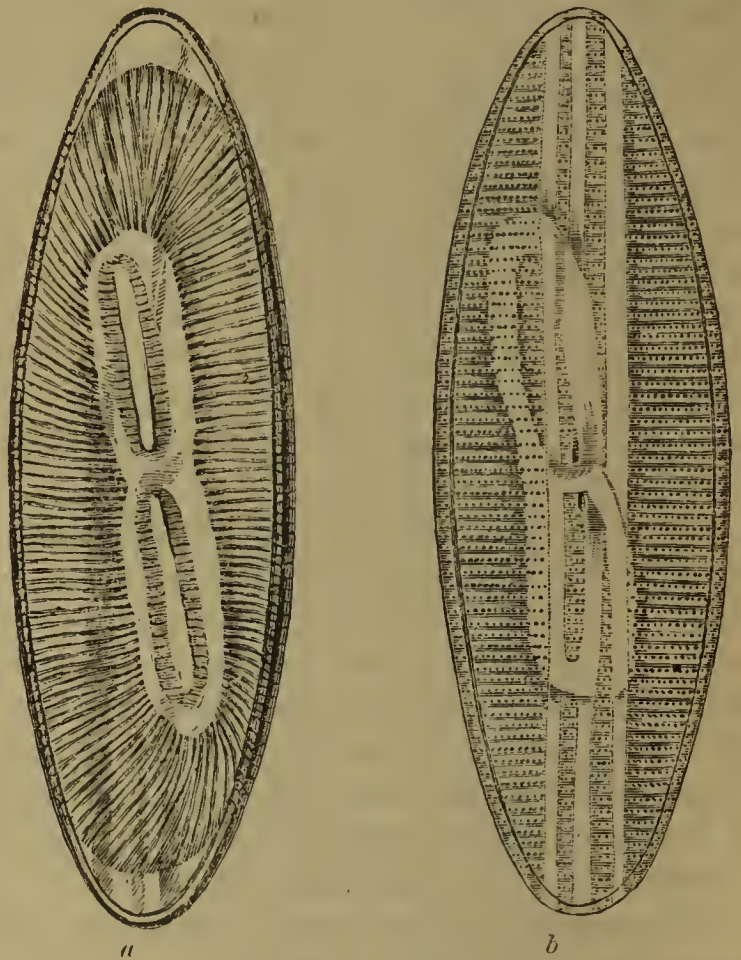


Fig. 56. *Navicula lyra*,  $\times 350$ .  
a, Upper valve. b, Lower valve.

remarkable. In fig. 56 a there is a view of this diatom as seen with the upper valve in focus, Fig. 56 b gives the appearance when the microscope is focussed down to show the lower valve. The power which resolves the lines of the lower valve into clearly-marked and distinct dots, exhibits the lines of the upper valve as coarse striæ which cannot be thus resolved, and had the two valves been separate, few would suppose them to be portions of the same diatom.

From the numerous instances of similar variations that I have observed, I am led to agree with those who apprehend that the possibility and extent of variations of structure in the same species, and even on the valves of the same diatom, have not been sufficiently appreciated, and that if they had been duly estimated, there would have been much less of that extensive multiplication of supposed new species on insufficient grounds, which is still the reproach that can justly be cast upon the results of the microscopical research of the Diatomaceæ.

There is every reason to expect that in the course of time the errors of past interpretation will be gradually corrected, and now that the Royal Microscopical Society is established as a national institution, microscopists scattered throughout the kingdom will look to this society for the influences ne-



cessary to guide the course of future inquiry in a proper channel. Should there not be in existence a standing committee of veteran diatomists in connection with that influential society? To such a committee supposed new forms might be sent for examination, and novel questions of structure might be referred. Surely the approval of such a committee would stamp a theory with importance, and a new specimen or species with authenticity. Then more confidence would be reposed in the results of inquiry, and a powerful but quietly operating check would be given to the too hasty publication of new species. And, as far as may be connected with the study of the Diatomaceæ, much that has hitherto been devoted to mere erratic microscopic recreation, would come to be employed in orderly and regular microscopical research.

*Armagh.*

LEWIS G. MILLS, LL.B.

### THE MIDNIGHT SKY.\*

WE cannot wonder why, in the earlier ages of the world's history, men should have looked upon the stars with mysterious reverence, and should have fallen upon the earth in adoration of the sun. There is such a sublime immensity in the starry heavens, so that, even now, when we are fallen upon prosaic times, one cannot go abroad and stand in the presence of brilliant starlight without feeling moved. The first impression is always that of admiration, of reverence, sometimes akin to awe. Even in London—when the inhabitant can see bright starlight—the hum of busy life is forgotten, and he stands in mute astonishment contemplating the spangled canopy of heaven. When this feeling subsides, it is usually followed by a desire to know something more of the mysterious lights in the sky. What are they? What names do men call them? Which is the Polar Star? Which is the Great Bear? Where are the Seven Sisters? and a host of similar queries. Then comes an inquiry for some book which shall teach the names of the heavenly bodies, which shall give some information about the constellations; which can instruct a novice concerning planets and the Milky Way, and a hundred other suggestions which cross the mind of him who gazes at the stars. To such question or questions we think that we can give one very satisfactory reply. It is the title of the book which heads this notice, and which has been published to furnish just such kind of information as our supposed querist requires. This work commences with the Midnight Sky in London, and under each month of the year is given a view of the sky looking south, and another

looking north, with a chapter of description of the constellations and the most important stars visible in each month, with their positions, and how to find them. Then follows the Midnight Sky of the Southern Hemisphere in February, May, August, and November, with similar sky-views. These are succeeded by chapters on the Constellations, general notes on the Fixed Stars, notes on the Solar System, and Meteors, or Shooting Stars. Such a brief summary fails to give an adequate idea of the contents of this elegant and useful volume. It is a credit to the society which issues it, to its author, and also to its printer. The thirty-two star-maps are like photographs of the sky, and in themselves would commend the volume to our readers. "Oh!" inquires some one, "is it not very dry reading?" By no means. If there is any interest in the subject to commence with, any desire to acquire information, then the book will be found to abound with attractions; and we commend it, unhesitatingly, as a popular and, withal, a safe guide for all who have any lingering desire to study the stars.

### MUSICAL FISH.

THE following is a translation of the letter of M. O. de Thoron on this curious subject, communicated by him to the Académie des Sciences, December, 1861. I send it with the hope of eliciting further information respecting these wonderful members of the finny tribe:—

"While making an exploration in the Bay of Pailon, situated to the north of the province of Esmeraldas, in the republic of Ecuador, I was coasting along, about sunset, when I suddenly heard a strange sound, extremely grave and prolonged. At first I thought it came from a fly or hornet of extraordinary size. But seeing nothing above me or in the neighbourhood, I asked the rower of my pirogue whence the sound came. 'Monsieur,' he replied, 'it is a fish which is singing thus. By some it is named the Siren, by others, Musico.'

"Having advanced a little further, I heard a multitude of different voices, which harmonized together, imitating a church organ to great perfection. I at once stopped the pirogue, and listened for a long while to this singular melody.

"It is not only in the Bay of Pailon that I have enjoyed this phenomenon: it occurs in several places along the coast, and even still more markedly in the river Matajé, especially at the foot of a little promontory called Campana (the Bell). On going up higher than Campana, the traveller reaches Campanilla, where a similar circumstance occurs. I have heard it said that, in the river Molino, an affluent of the Matajé, the same singing of fish has been heard. It is evident, therefore, that to whatever species these fish belong, they are capable of

\* "The Midnight Sky: familiar Notes on the Stars and Planets." By Edward Dunkin, F.R.A.S., of the Royal Observatory, Greenwich. London: the Religious Tract Society.



living in two qualities of water; inasmuch as that of the bay is purely salt, while that of the river is brackish—at least, it mingles with the ocean only during tidal hours.

“The piscine performers execute their music without being disturbed by the presence of boats, and without showing themselves at the surface of the water, and this during several successive hours. One is surprised that so loud and distinct a sound can proceed from an animal not more than ten inches long. The fish itself has nothing particular in its external conformation to commend it. The colour is white, with some bluish spots on the back; at least, this is the fish which one catches with a hook on the spot during a concert.

“It is towards sunset that the fish begin to make themselves heard, and they continue their song during the night, imitating the notes of an organ very exactly,—as when one is near the door of a church, but outside, not inside the sacred edifice.”

What is the name of this wonderful fish? Will not modern enterprise provide us with these charming sirens? What an opportunity to the caterers of the new Brighton Aquarium to secure the “greatest novelty of the day”!

Havre.

W. W. SPICER.

#### INSECT EMBRYOGENY.

THREE years ago the entomological world was much interested in the discovery of the phenomenon of parthenogenesis in the larva of a gnat (*Cecidomyia*). The particulars are given in Dr. Fripps's paper in the *Popular Science Review* for April, 1867. They are very curious. It has not hitherto been surmised that the larva of *Aphrophora spumaria*, the Cuckoo-spit, affords another instance. The Baron De Geer, the great Swedish naturalist, noticed that the female Frog-hoppers (so the perfect insects are called) become so gravid in September that they can scarcely fly. The eggs could not well cause this inconvenient gravity, because they are deposited at a much later season,—in England certainly, and probably in Sweden also. The eggs do not seem to encumber the insect, according to my observation, even in December, immediately before their deposition. We may therefore suppose De Geer's observation to have applied to females about to become viviparous; though he does not seem to have suspected it. That it might have been so, is rendered certain by the occurrence of an embryo within the abdomen of a larva taken in my garden, and now in my cabinet. The claws, eyes, proboscis, and antennæ are to be clearly distinguished, and even the lenses of the eyes when considerably magnified. The antennæ appear of an unusual size; but they comprise only the normal parts, and are obviously immature. The mother

larva in this example is about three parts grown to maturity; the wing-cases being still incomplete beneath the outer skin.

This discovery—for such it is presumed to be—may, it is hoped, in some degree condone for any mistakes in my first paper on this insect, *SCIENCE-GOSSIP*, 1868, p. 168. Doubtless the larva does change its skin repeatedly, like other larvæ, though I have argued on the contrary supposition. The changes, however, may take place at such long intervals that my inference may not be wholly damaged. It may now be left to entomologists and physiologists to pursue this new fact, unexpectedly started upon a well-beaten field. S. S.

#### THE GOLDEN PLOVER.

(*Charadrius plumialis*.)

ALTHOUGH this beautiful plover may be considered to be with us an indigenous species, being resident in some parts of the country throughout the year, it is nevertheless affected by the laws of migration even within the limited area of the British islands.

In Scotland and the north of England, as well as in some parts of Ireland, it nests regularly every year, selecting the lonely moors and mountain-sides, where it remains from April to August until the young are strong upon the wing. Towards the end of the latter month large flocks begin to congregate and gradually move southwards, to spend the winter on the open marshes and wastes, or on the coast, where there is a greater certainty of finding food.

It is in the winter plumage (as shown in the accompanying woodcut) that the Golden Plover is best known to the wild-fowl shooter, by whom it is eagerly sought after, both for sport and profit. The gregarious habits of this bird in winter often lead to large numbers being killed at a single shot, while the estimation in which it is held as an article of food is a sufficient inducement to take some trouble to procure it.

During the winter months Golden Plovers may often be found consorting with Peewits and Field-fares, and feeding on the same diet; but, independently of their size, they may always be distinguished when on the ground at a distance by their peculiar motion, running with short quick steps and stopping abruptly; now and then dipping down the head to seize a worm, and elevating the tail considerably.

In enclosed districts they are generally to be found on the fallows, where they devour large quantities of earthworms; but they are particularly partial to flooded meadows and the soft ooze of our tidal harbours. In the meadows they find abundance of insect and vegetable food; on the



ooze their diet consists chiefly of small mollusca of various kinds and the fry of the common mussel.

At the approach of rain the flocks become very restless, wheeling about to and fro, and constantly shifting their ground. On this account it is said that the specific name of *pluvialis* has been applied to the bird, and, in some parts of the country where it is common, persons profess to foretell the weather by watching the movements of the flocks. So long as the weather remains fine and open these birds are uncommonly wary, but a dull rainy day seems to take away all their energy, and they sit huddled together, with their heads drawn in between their shoulders, looking at a little distance more like inanimate clods of earth than birds. As on these occasions they are more easily approached, the most successful shots we ever made at Golden Plover were always obtained on a wet day; and it would seem, therefore, as if there were good reason for the saying that the bird is called *pluvier* in France, "parce-qu'on le prend mieux en temps pluvieux qu'en nulle autre saison."

"There is, in shooting plover, a common remark made by sportsmen, that the *second* is always the most productive barrel. The rapidity with which they vary their position when on the ground seldom admits of a grand combination for a sitting, or rather a running, shot. But when on the wing their mode of flight is most favourable for permitting the shot to tell; and it is by no means unusual to bring down a number. When disturbed they frequently wheel back directly above the fowler, and offer a tempting mark, if he should have a barrel in reserve; and even when too high for the shot to take effect I have often thrown away a random fire; for the plover, on hearing the report, directly make a sweep downwards on the wing, and I have by this means brought them within range of the second barrel." \*

Thompson, in referring to this singular habit of the Golden Plover, † gives an amusing anecdote on the subject, as related to him by a friend.

"In the winter of 1847 I went to some boggy meadows in the neighbourhood of Belfast, for the purpose of shooting Golden Plover, and took with me a young lad who had never before been on such an expedition. When returning home a flock, consisting of about fifty of these birds, flew overhead beyond reach of the shot; but as I despaired of getting nearer to them, I fired at the flock, on which they instantly swept down, almost perpendicularly, within three or four yards of the ground. My companion ran forward in the greatest delight to pick up, as he expected, the entire flock, when to his utter amazement, they all resumed

their former mode of flight, and quickly disappeared in the distance."

Towards the end of March or beginning of April, the large flocks break up, and smaller parties may be observed moving northwards again towards their breeding haunts. About this time sundry black feathers make their appearance on the throat and breast, giving indications of that remarkable change from winter to summer plumage, when the underparts, from being pure white, become jet-black.

We shall not easily forget the first occasion on which we met with the Golden Plover in summer plumage.

Walking, in the middle of May, over a wild moor in Northumberland, where the eye rested on nothing but heather and sky, we were watching the circling flight of a curlew, and wondering whether we could find the nest. Suddenly we were almost startled by a soft, clear whistle, which sounded so close at hand that we turned round, expecting to find a follower who might have some message to deliver. Nothing was to be seen, and while we gazed and wondered, again it sounded clear and plaintive, bringing to mind those lines of Walter Scott, in the "Lady of the Lake,"—

"And in the Plover's shrilly strain,  
The signal whistle 's heard again."

There was something very ventriloquial in the sound, and it was a long time before we were able to determine the exact direction whence it proceeded.

At length having decided this, and concluding that it must be a Golden Plover, although the note differed from the well-known call which we had so often heard in winter, we went down on hands and knees and crawled stealthily towards the spot where we supposed the bird to be, stopping now and then to listen for the guiding call.

So fully convinced were we that the bird was at least a hundred yards ahead, that it was with considerable surprise we came upon it before we had accomplished half that distance.

We can conceive few emotions more pleasurable than that which sways the mind of a naturalist when looking upon a species which is new to him; and we shall never forget the delight which we experienced on that occasion, when, peering through the heather, we saw for the first time, within ten yards of us, a black-breasted Golden Plover. Although so many years ago, we can still recall every attitude of the bird as we first saw it. The uplifted wing and short quick run, as if for a meditated flight, and then the sudden repose and motionless attitude, on finding that no danger threatened. We watched it till our eyes swam, when another came in view, announcing its presence by a soft whistle exactly similar to that we had heard before.

Our curiosity satisfied, we rose to our feet and

\* "Wild Sports of the West," p. 292.

† "Nat. Hist. of Ireland,"—Birds, ii. p. 88.



both birds took wing. Soon we saw a third and a fourth, and picking up the almost forgotten gun, began to think of securing one or two specimens for closer examination. This we had no difficulty in doing, for the birds were by no means wild. We concluded from their actions, and from the early date, that they had not yet commenced to nest; and this conclusion was strengthened by the fact that we searched a large tract of ground for more than three hours without finding any eggs.

Cowper in his "Winter Walk at Noon," says:—

"There is in souls a sympathy with sounds,  
And as the mind is pitch'd, the ear is pleased  
With melting airs and martial, brisk or grave;  
Some chord in unison with what we hear  
Is touch'd within us, and the heart replies."

How often have we proved the truth of this!

Had we remained later on the moor referred to, we should in all probability have been rewarded by finding the eggs, since we have been assured that the Golden Plover breeds there annually. The nest



Fig. 57. THE GOLDEN PLOVER (*Charadrius pluvialis*).

The two specimens which we carried home had not quite assumed their full summer dress, there being still a few white feathers cropping out upon the breast and belly. The stomachs of both contained a number of little shining beetles, and a few small univalves, of which we could not then determine the species.

At this time of year, May, the whistle of the Golden Plover seemed unceasing, and proceeded from the birds while on the ground; but in the winter we have never remarked these birds to call much except when disturbed and on the wing. Their plaintive note upon a lonely moor or mountain-side has something indescribably wild and pleasurable about it, and we never hear it without feeling, like Burns, an elevation of soul like the enthusiasm of devotion or poetry.

is a very slight affair, not unlike that of the Peewit, and the eggs also are very similar to the Peewit's eggs, although larger and more richly coloured.

The young when first hatched are remarkably pretty little things, being powdered over, as it were, with golden yellow upon a brown and grey ground-colour. They run as soon as they leave the shell, and fly well by the end of July. The family parties then unite in August, and begin to form those dense flocks to which we have already referred, and which are looked for in winter with such eagerness by sportsmen in the south. J. E. HARTING.

VARIETIES OF SPARROW.—A few months ago a *black* variety of the common House Sparrow was killed near here, and a week or two ago one of a uniform fawn-colour.—G. B. C., Ringwood.



## NEW DIATOMS.

A DESCRIPTION and figures of some of the Diatomaceous forms obtained during the voyage of the Imperial Austrian frigate *Novara*, extracted from Herr Grunow's work,\* may be acceptable to the readers of SCIENCE-GOSSIP. I have therefore selected the following as the most interesting.

1. "*Climacodium*, Grun. — Frustules smooth, scarcely siliceous; ends more or less enlarged, truncate, forming a lengthened filament.

"*Climacodium Frauenfeldianum*.—Characters that of the genus. In floating masses on the sea near Telangshong (fig. 58). A very remarkable genus; the frustules are slightly siliceous; it is possibly related to *Eucampia zodiacus*. I know no diatom which can be better compared to a ladder than this. I have therefore given it the above generic name." (Judging from Herr Grunow's figure, I am inclined

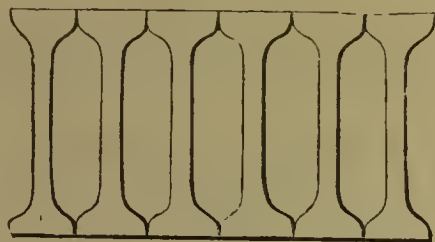


Fig. 58. *Climacodium Frauenfeldianum*,  $\times 100$ .

to doubt the diatomaceous nature of the organism; the absence of a connecting zone, so important a feature in the diatomaceous frustule, renders its position in the class *Diatomaceæ* very dubious.)

2. "*Pleurosigma validum*, var. *nicobaricum*, Grunow.—Valve lanceolate, ends slightly obtuse, median line straight, nodule slightly dilated (transversely), striæ oblique, 40 to 44 in '001"; in 'Polycystin stone' (*Polycystin Gestein*), island of Nankoori (fig. 59). It is probably related to my *P. giganteum*, but is smaller, shorter, and has less obtuse ends. The transverse striæ are somewhat stronger than the oblique, which, as they approach the ends, become somewhat more oblique." (The *Pleurosigma validum* of Shadbolt is identical with *P. rigidum* of the Synopsis. The variety figured by Herr Grunow is not uncommon. I have it in a gathering from the French side of the Channel, Corsica, Jaffa, and the West Indies. The increasing obliquity of the striæ as they approach the ends is produced by the "increased pitch" of the valve on either side of the median line, as it approaches the apices: a transverse section in the middle would be an obtuse, that at or near the ends an acute, angle.)

3. *Stictodiscus californicus*, var. *nankooensis*, Grunow.—Valve with radiating and anastomosing costæ, the spaces between the costæ with a single row of conspicuous granules. Occasionally in the "Polycystin stone" from Nankoori (fig. 60). Like Greville's species, a row of puncta is placed between two costæ. The costæ divide in various ways as they approach the circumference, and the puncta are consequently more numerous. The puncta on the central portion of the disc are arranged in an irregular network, from which the marginal costæ proceed: the same may possibly be found in the Californian species.

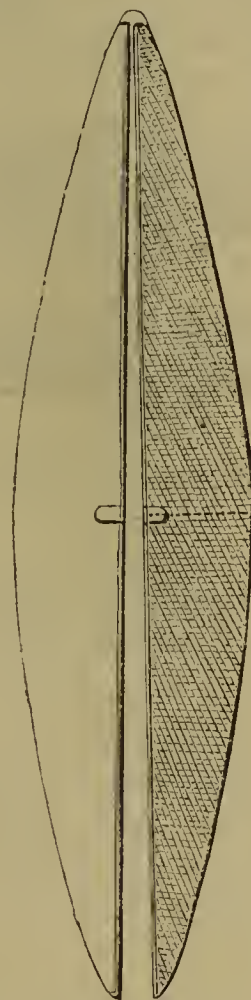


Fig. 59. *Pleurosigma validum*, var. *nicobaricum*,  $\times 400$ .

4. *Achnanthes inflata*, Grunow = *A. ventricosa*, Ehr. (nec. Kutzing) = *Stauroneis inflata*, Kutzing, "Bacillarien" Fossil Deposit. Tahiti, Java.\* Although not a new form, and its occurrence merely noticed by Herr Grunow, I give a figure and description

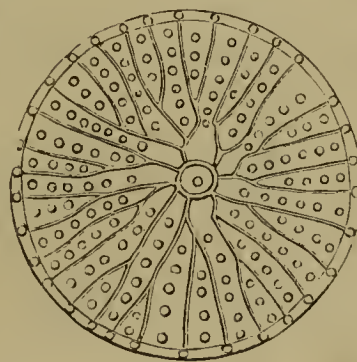


Fig. 60. *Stictodiscus californicus*, var. *nankooensis*,  $\times 500$ .

of it, as I have found it sparingly in some moss from a marsh near Norwich. I must differ from

\* "Reise seiner Majestät Fregatte Novara um die Erde." Botanischer Theil. 1 Band: Algen. Bearbeitet von A. Grunow.

\* Essbare Erde.



Professor Ehrenberg and Herr Grunow as to the generic position of this form; it appears to me to be an *Achnanthidium*, rather than an *Achnanthes*; an opinion in which Dr. Arnott concurred. Neither can I admit its identity with *Stauroneis inflata* of Kutzing. The conspicuous pearly granules are not shown in his figures, nor mentioned in the text of his "Bacillarien," or "Species Algarum." He could scarcely overlook them, even taking into consideration the inferiority of the instruments in use at the time the above works were written.

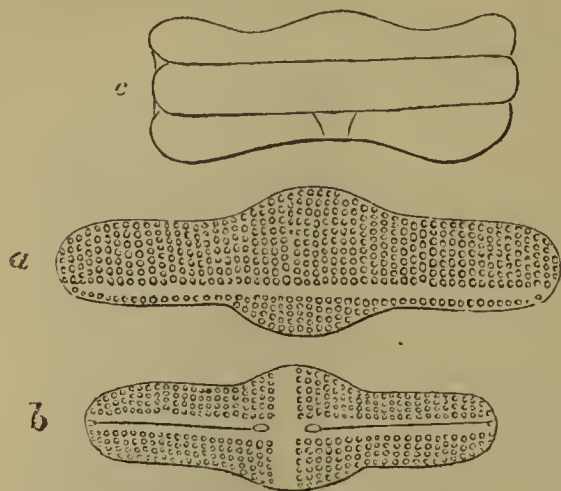


Fig. 61. *Achnanthes inflata*.  
a, Upper valve. b, Lower valve. c, Frustule.

*Achnanthes inflata*.—Frustules stipitate? arcuate; valves conspicuously inflated at the centre; ends

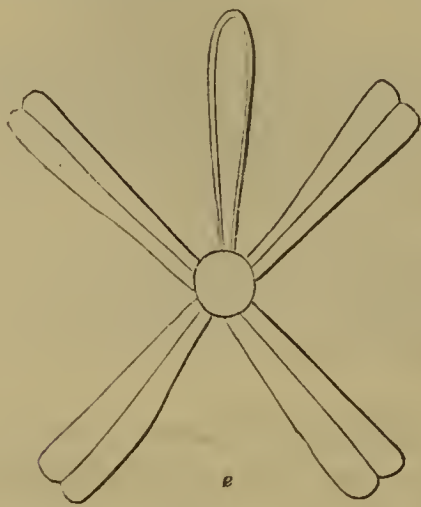


Fig. 62. *Gomphonitzschia Ungeriana*,  $\times 400$ .  
c, Frustules in situ, sessile.

broadly rounded; lower valve with median line and pseudo-stauros reaching margin; upper valve

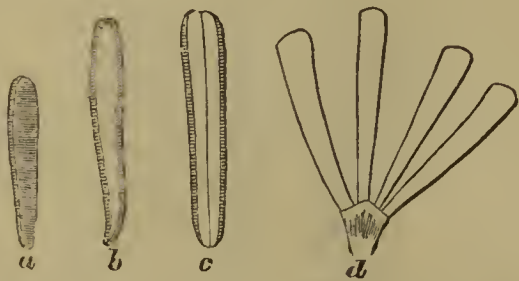


Fig. 63. *Gomphonitzschia Ungeriana*,  $\times 400$ .  
a, Side view of valve. b, Side view of frustule. c, Front view of frustule. d, Frustules in situ, stipitate.

with excentric median line; pseudo-stauros absent; markings transverse rows of conspicuous pearl-like

granules; recent. Norwich, New Hebrides, Tahiti (fossil), in fossil deposit Java, and New Zealand (fig. 61).

*Gomphonitzschia* (n.g.), Grunow. — Frustules nitzschoid, sessile or stipitate.

5. *Gomphonitzschia Ungeriana*, Grunow. — Frustules small, narrow, linear, cuncate; valves linear-lanceolate, cuneate; apices rounded, marginal puncta 33 in '001"; striæ transverse, very fine, 60 in '001" (figs. 62, 63).

6. *Navicula pacifica*, Grunow (fig. 64). — No description is given of this form; the larger valve is rhomboidal, apices acute, striæ moniliform, distant,



Fig. 64. *Navicula pacifica*.

radial, reaching median line; the smaller form is elliptical, apices rounded; in other respects like the larger form.

Herr Grunow notes the occurrence of *Nitzschia latestriata* in the gatherings of the *Novara*, and in doing so repeats the mistake of Prof. Smith and Herr Kalfs. *Nitzschia bilobata* of the Synopsis is not the *Amphiprora latestriata* of De Brebisson; the latter form is not a *Nitzschia* but the *Navicula convexa* of Smith, and the *Scoliopleura convexa* of

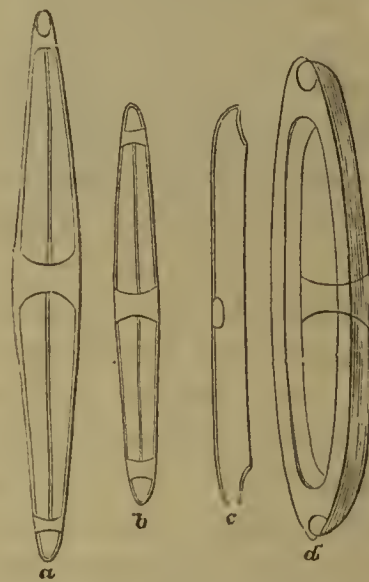


Fig. 65. *Pleurostauron Frauenfeldianum*,  $\times 400$ .

Grunow. M. de Brebisson, misled by the erroneous figure in the Synopsis, and which I believe he saw before the text was printed, wrote to the author that he thought it to be the same as his *A. latestriata*. A comparison of the description of the latter in the "Species Algarum" with that of *N. bilobata* in the Synopsis at once shows that the forms are not identical. Kutzing describes the striæ as coarse. Smith says those of *N. bilobata* are distinct, 56 in '001" (his figure represents them about 12 in '001"). The practice of retaining the generic or



specific name of an author when one of the names is changed is wrong in principle. *Nitzschia bilobata* cannot be fairly described as *latestriate*, and M. de Brebisson ought not to be made responsible for the blunder. *Pleurostauron Frauenfeldianum*, Grunow, seems to be identical with *Stauroneis seaphulæformis* of Greville. *Mic. Journ.*, vol. xiv. p. 85, pl. 9, fig. 32, differs from *Stauroneis Legumen*, var. of Lewis, in the staurons being dilated at the margins. Not uncommon in the Java deposit (fig. 65).\*

F. KITTON.

### FEROCITY OF THE WILD CAT.

(Catus ferus.)

A PORTION of the forest near my house bears the name of "Wild Cat Wood," from a tragical event which occurred there some years ago. One winter's morning a keeper on going his rounds discovered the footmarks of a Wild Cat on the freshly-fallen snow; overjoyed at his good fortune and at the prospect of destroying the brute, he speedily followed up the track, which led him eventually to a large hollow beech-tree. It was evident, on examination, that the cat was concealed within the tree itself, the keeper therefore proceeded to strike the stem with a hammer which he chanced to have with him, in order to frighten the animal from its lair, at the same time keeping his gun ready for a shot. One, two, three strokes were given, when without a moment's warning, the animal sprang on the man's back and began tearing at his head and neck. In a moment it had clawed off his thick fur cap, and was biting savagely at his neckcloth, with the evident purpose of getting at his throat. The keeper taken by surprise, and thinking only of getting rid of his assailant, flung away his gun and hammer, and threw up his hands to save his face and neck, at the same time shouting loudly to his son, who he knew was not far off. The cat meanwhile was lacerating his face and throat with teeth and claws, until the miserable man fell to the ground in a state of exhaustion. Just at this moment the son came on the scene, and seeing the state of affairs, seized the hammer, and after some trouble managed to give the fierce beast its *coup de grâce*. With the aid of some peasants, whom the noise of the scuffle had attracted to the spot, the unfortunate keeper was carried to his house in a pitiable condition. A medical man was soon on the spot, but his efforts were of no avail: before night closed in the keeper died in great agony, having, however, recovered his consciousness sufficiently to give an account of his death-struggle with the Wild Cat.—*Illustrirtes Thierleben*, by A. Brehm.

### GIGANTIC RIBS.

THE following description does not appear to relate to the "Dun Cow," but it may prove interesting in connection with the recent correspondence.

I well remember a delightful geological and botanical excursion made in June, 1866, in the higher portion of the beautiful valley of the Tanat, which small but clear-flowing river rises in Montgomeryshire, upon the Berwyns, passes along the southern border of Denbighshire, and re-enters the former county, only to lose its waters in the broader and longer Byrnwy, a few miles above the junction of the latter with the Severn.

Tracing the Tanat upwards, we pass Llanymynech and Blodwell villages, and then Llangedwyn Hall, one of the seats of the well-known baronet Sir Watkin W. Wynn, leave Llanrhaiadr-yn-Mochnant upon the right, and finally arrive at Llangynog, noted for its once valuable lead-mine and its slate-rocks. Here the present valley terminates upon the broad side of the Berwyns, and the river turns almost at a right angle, by a contracted passage, into another valley, narrower but more diversified, following the line of that lofty and far-stretching range, which forms its western boundary, the eastern one consisting of a series of high and precipitous hills, with deep "cwms" or intersecting tributary depressions. This upper valley forms one of the most secluded and charming spots in the Principality. It also ends upon the Berwyns, from which the river, now only a narrow rill, descends over a rugged precipice in a waterfall—Pistill Blaenycwm—of great height and wild beauty. In the centre of this valley, about two miles from Llangynog, where it widens by receiving secondary valleys from between the bounding hills, there stands the quaint and ancient, and now dilapidated, church of Pennant Melangell, once of great ecclesiastical importance and celebrity. It is dedicated to St. Monacella or Melangell. The traditional history of this saint is curious. She is said to have been the daughter of an Irish king, who, to avoid an unwilling marriage to a noble for whom she was intended by her father, took a vow of celibacy, crossed the Channel, found refuge in North Wales, made her way to this hidden and romantic spot, and lived here undisturbed for fifteen years. A prince of Powys, while coursing, discovered her retreat by the frightened hare taking refuge in her cell, which his dogs, by reason of her sanctity, were afraid to enter. Much struck with her beauty and character, the prince established an abbey here, gave it special rights of sanctuary, and appointed her its abbess. As such she lived for many virtuous and beneficent years, and was then buried in the present churchyard. She became the

\* The figures, with the exception of fig. 61, are copied from Herr Grunow's work.



patroness of hares, which were for a long time held sacred in the neighbourhood for her sake, and termed St. Monaeella's lambs. So runs the story.

In the church is preserved a gigantic rib, such as those which have been described by your correspondents. No legend appears to attach to it, and its history cannot be traced. It is at least four feet long, and of considerable thickness, with a smooth exterior, not showing any fossil character, nor any trace of having been ever in the earth. "Natives" sometimes say that it is a giant's rib, or even one of the ribs of St. Monaeella herself. If the latter be true, the prince's admiration would certainly not be unqualified with astonishment, for its fair owner could not well have been less than twenty feet high! These are native guesses, however, more than assertions; but it is possible, though scarcely probable, that in time they may solidify or crystallize into traditions whose origin seems remote and lost.

The whole region may be warmly recommended to the notice of pedestrians who wish to leave the beaten track of the ordinary tourist and conventional pleasure-seeker.

Timbridge Wells.

W.

As to "Ribs of the Dun Cow" I plead total ignorance; but the following two facts may be worth recording:—

1st. There is a bone of immense size, called the Giant's Rib, kept in the church of Pennant Melangell, in the adjoining county (Montgomery); its origin and history is unknown, but there it is, but has nothing to do with the osteology of a cow.

2nd. Another is in the church at Mallwyd, in the same county; and, I believe, some other of our North Wales churches contain similar remains.

Llanderfel.

W. P.

## ZOOLOGY.

**AFFECTION OF INSECTS FOR THEIR YOUNG.**—We are indebted to De Geer for the history of a Field Bug (*Acanthosoma grisea*), a species found in this country, which shows marks of affection for her young, such as I trust will lead you, notwithstanding any repugnant association that the name may call up, to search upon the birch-tree which it inhabits, for so interesting an insect. The family of this Field Bug consists of thirty or forty young ones, which she conducts as a hen does her chickens. She never leaves them; and as soon as she begins to move, all the little ones closely follow, and whenever she stops, assemble in a cluster round her. De Geer having had occasion to cut a branch of birch peopled with one of these families, the mother showed every symptom of excessive uneasiness. In other circumstances such an alarm would have caused her immediate flight; but now she never stirred from her young, but kept beating her wings

incessantly with a very rapid motion, evidently for the purpose of protecting them from the apprehended danger.—*Kirby, Introd.*

**SOUNDS PRODUCED BY INSECTS.**—The only kind of locomotion during which these animals produce sounds is flying; for though the Hill Ants (*Formica rufa*) make a rustling noise with their feet when walking over dry leaves, I know of no other insect the tread of which is accompanied by sound, except indeed the Flea, whose steps, a lady assures me, she always hears when it paces over her nightcap, and that it elicks as if walking on pattens!—*Kirby.*

**ABSTINENCE OF INSECTS.**—Some insects have the faculty of sustaining a long abstinence from all kinds of food. This seems to depend upon the nature of their habits. If the insect feeds upon a substance, of a deficiency of which there is not much probability, as on vegetables, &c., it commonly requires a frequent supply; if, on the contrary, it is an insect of prey, and exposed to the danger of being long deprived of its food, it is often endowed with a power of fasting which would be incredible but for the numerous facts by which it is authenticated. The Antlion will exist without the smallest supply of food, apparently uninjured, for six months; though when it can get it, it will devour daily an insect of its own size. Vaillant, whose authority may be here taken, assures us that he kept a spider without food under a sealed glass for ten months, at the end of which time, though shrunk in size, it was as vigorous as ever. And Mr. Baker, so well known for his microscopical discoveries, states that he kept a darkling beetle (*Blaps mortisaga*) alive for three years without food of any kind. Mr. Stephens having in June, 1831, put a specimen of *Lepisma saccharina* (the common "Wood," or "Sugar-fish") in a pill-box containing only a few grains of magnesia, found it to his great surprise alive and active in June, 1833!—*Kirby, Introd.*

**MOLLUSC ON SHORE.**—The Mollusca forwarded by J. T. H., cast ashore in Pegwell Bay during the late gales, are fine specimens of *Pleurobranchus membranaceus*; though outwardly resembling many of the Nudibranchiata, they belong to the Tectibranchiate section of the order Opistho-branchiata. The species has hitherto been taken principally on the Devonshire and Irish coasts.—*W. S. Kent.*

**MR. CROSS, of Liverpool,** lately received a large importation of serpents and other animals. Two boa constrictors, whilst in a dormant condition measured eight feet and ten feet in length, and one of the pythoneses, whilst on the voyage from the West Indies to Liverpool, gave "birth" to no fewer than thirty-five pythons—all of which, notwithstanding they were inclosed in a box not larger than an ordinary Foyle salmon-case, were in good condition on being sent ashore.



THE DINORNIS.—At a recent meeting of the Zoological Society of London, a communication was read from Professor Owen, containing a letter received from Dr. Haast, F.R.S., on the discovery of cooking-pits and kitchen-middens containing remains of various species of *Dinornis*, in the province of Canterbury, New Zealand.

PUPPY PROPENSITIES.—A pup spaniel of King Charles's breed, nursed by a cat, is as afraid of rain as his foster-mother. He licks his feet two or three times a day for the purpose of washing his face, which operation he performs in the true cat-tish position, sitting up on his tail; he will watch a mousehole for hours, &c.—*Miss Mitford*, vol. ii. p. 277.

LYTTA VESICATORIA.—I wish to record the capture of a fine specimen of *Lytta vesicatoria* here in May, 1869. It was crawling on the road in the sun. I am aware it is occasionally taken in the south of England (Rye), and Curtis gives Norwich, Cheltenham, Isle of Wight, and Cambridgeshire as localities. I should be glad to hear if any of your readers have taken it in 1869.—*E. Lc. H. Fox, M.D. (Lond.), Broughton, Winchester.*

SAGACITY OF BEES.—Call it instinct or what we may, the fact I am about to relate seems to be very nearly akin to reasoning power; indeed, I cannot myself detect wherein the difference lies. It may be quite familiar to many of your readers, therefore some apology may be necessary to them for reproducing it here; but in all probability there are many others to whom, as to myself, the curious circumstance I allude to is unfamiliar and new. My attention was casually directed last summer to a plant of the common Fuchsia blooming outside my window, which attracted a number of bees to its pendent flowers. I observed them to be very restless and apparently dissatisfied with their persevering attempts to rifle the flowers of their saccharine juices. Now these juices are contained in a little bulbous cell at the base of the corolla, and at such a distance from the expansion that the insect finds it very difficult, if not impossible, to reach the coveted store. In this dilemma what was the expedient adopted? Burning apparently with anger, it ceased its ineffectual attempts from below, and mounting the outside of the corolla, actually pierced a hole through into the bulb, giving it direct access to the interior, and an easy extraction of the sweets. The circumstance appeared to me as a notable instance of sagacity closely allied to reason.—*W. Smart.*

NATURAL HISTORY OF FOLKESTONE. — The Natural History Society of Folkestone have just issued a list of the Butterflies and Moths of the neighbourhood, by Dr. H. G. Knaggs. This is in-

tended to be followed by lists in other branches of natural history. Legitimate work for a local society, and likely to prove very valuable if well done, as this has commenced. Let the promoters go on and prosper.

BEARDED TITMOUSE.—(*Parus biarmichus*, Linn.).—This species is scarce in Turkey; it breeds in the interior of the country, at Varna and on the borders of inland lakes, amongst the reeds, and is sometimes taken at Smyrna on its migration.—*The Levant Times.*

LARVA OF GOAT-MOTH.—A few springs back, as a carpenter in Sussex was fixing some park-palings along an old fence, in clearing the ground at the foot of an oak-tree he found a nest of *worms*, as he called them; but which, from his description and the disgust he evinced at his discovery, were, I doubt not, larvæ of the Goat-moth. There were about forty of them, which he speedily immolated. I visited the spot, and saw where they had scooped out their winter's domicile, but not until then did I know, or had heard, that the larvæ are gregarious in their habits of hibernation. Is it a known fact? —*W. Smart.*

SOLITARY SNIPE (*Gallinago major*).—Two specimens were shot in the neighbourhood of Killarney three or four weeks since.—*E. B., Jan. 17th, 1870.*

SOMETHING LIKE A SWARM OF FLIES.—As some peasants were busy planting trees on the heights of Esperon (a portion of the Cevennes range), on the 7th of September, they were startled by a dull hollow noise, not unlike that of a distant storm. It wanted still two hours of sunset, and the atmosphere was clear and bright. On endeavouring to ascertain the cause of this unusual sound, it soon became evident that it proceeded from a dark cloud enveloping a low hill at a distance of some ten kilometres (six miles). Their first thought was that it must be a column of smoke issuing from a large fire; what then was their surprise, on drawing nearer, to find that the dark cloud was really an enormous swarm of flies, measuring not less than five hundred metres in length, fifty in height, and thirty in breadth. This monstrous phalanx was moving slowly in a westerly direction.—*Année Scientifique, par L. Figuier.*

BIRDS, AFFECTION IN.—At Brymbo, Denbighshire, during a very heavy shower of hail, a lady and gentleman, whom I know, were standing at a window, when they observed a bird like a wood-pigeon, fly into a large tree which grew close to the house, and where his mate was sitting on her nest, and exposed to the storm; the cock bird immediately spread out his wings as a covering, and kept them spread until the shower was over.—*Samuel W. Brennan, Vicar of Cusheadun.*



INSECTS AS FOOD.—In this utilitarian age perhaps the most important question in entomology is to find out in what way insects can be employed for the benefit of mankind. A most curious instance has lately come to my knowledge which I think may interest some of your readers. My informant, M. Guerin-Meneville, a well-known sericulturist and economic entomologist, showed me some dark-coloured cakes resembling somewhat brown bread. These cakes are eaten extensively among the poorer classes and natives in the city of Mexico. They are made exclusively with the eggs of two kinds of water-bugs (*Corixa femorata* and a species of *Notonecta*). The natives cut quantities of reeds and other aquatic weeds, and strew them on the borders of the great lake near the city, and they are soon coated with eggs laid by the insects. These eggs, which are about the size of a mustard-seed, are deposited so abundantly as often to cover the plants entirely. The natives "harvest" these plants, and after exposing them some time in the sun to dry, scrape off the eggs and either keep them in that state for future use or pound them at once into meal. The perfect insects themselves are not neglected, for they are caught in great numbers and hawked about the streets as food for cage-birds and poultry, which are very fond of them. It is surprising that the raids which are practised against these insects in two of their states do not apparently diminish their numbers; they, however, multiply to such a degree, that notwithstanding the tribute they have to pay, enough survive to supply the natives with food year after year. M. Guerin-Meneville received samples of the insects, the eggs, "seed," meal, and cakes; but unfortunately the latter accidentally became saturated with spirits of wine in which a snake had been preserved, so that it was impossible to taste them.—*E. L. Ragonot*, 33, *Rue de Buffon, Paris*.

TINEA GRANELLA.—M. Guerin-Meneville showed me several small moths which came out of a pupa of *Bombyx Cynthia*; there were three small empty chrysalides sticking out of the large one. On examination I found that the moths were *Tinea granella*, a species which is supposed to feed exclusively on corn, as indeed its name would imply. When I resided in Liverpool I found this pretty species in astonishing numbers about corn warehouses. Is it true that many of the genus *Tinea* are polyphagous?—*E. L. Ragonot*.

PALLENE.—The figures of Pallene on page 28 remind me of a small animal named by its discoverer, G. Johnstone. It is figured in the *Zoological Journal*, page 489, and in *Loudon's Magazine*, vol. vi. It is there called *Nymphum coccineum*, but perhaps the rage for altering names has given it some other appellation. Mr. Johnstone found it in

Berwick Bay. Some time after I saw the account of it, I found it among the seaweed under Margate jetty. It is a curious creature, usually on its back, clinging to seaweed. Its antennæ are colourless, and their transparency might easily cause them to be overlooked. They are usually at right angles to the body, and then look something like a ring set on a pedicle. The circulation is seen very plainly; the eyes are placed on a tubercle on the top of the head; but the most interesting parts of it are the jaws, which are extremely delicate and transparent, and more nearly resemble two claws from a spider's foot than anything else I can think of. They are well worth hunting for, as they form a most beautiful object for the microscope.—*E. T. S.*

NESTING OF THE TEAL (*A. crecca*) IN HAMPSHIRE.—In Mr. Hartings's interesting article upon this handsome little duck, he says that "as a rule, and in the south of England especially, it can only be looked upon as a winter visitant." I do not wish in the least to cavil at this remark, but I thought it would be interesting to him and other ornithological readers to know that the Teal does breed in Hampshire every season, though of course not in any numbers. I have never yet been able to get any Hampshire specimens of the eggs for my oological collection, but I have seen them more than once. In 1868 several nests were taken along the course of the river Avon, and almost every season this species breeds in some of the bogs of the New Forest. A man who lives in the forest told me some time since that he had taken several nests at different times, and he further added that the bird generally builds under a bush of "golden withey," meaning I suppose the *Myrica Gale*, which grows in the bogs, and is often called by the above name. At the end of May last I had a very lovely-plumaged male Teal brought me, which had been picked up on the bank of the river: it had been dead too long a time for stuffing purposes, but the fisherman who brought it—when asked about the species breeding here—said he had seen *young* Teal in the river in previous seasons. It is doubtless well known that Gilbert White mentions the fact of Teal breeding at Selborne as a new and valuable discovery nearly a hundred years ago.—*G. B. C.*

SAGACITY OF RATS.—The following incident was told to me the other day by a resident, who vouches for the truth of it, and which happened close to his residence in Cushendun, co. Antrim. A rat, nearly white with age, and blind, was frequently seen led to the water by a young rat, by means of a straw, of which the old rat held one end and the young rat the other. This incident corroborates a similar statement given by Jesse in his "Gleanings of Natural History."—*Samuel W. Brennan, Vicar of Cushendun, co. Antrim*.



## BOTANY.

FRAGRANT BUTTERBUR.—It may interest some of your readers to know that they need not go so far as Torquay to find the Sweet-scented Coltsfoot (*Petasites fragrans*). It grows in a lane called Coombe Lane, about a mile from Croydon. Here it seems to be much later than at Torquay, flowering about February or March. I have also found *Dianthus Armeria* by the side of a cornfield not far from the same spot.—*W. H. Beeby*.

ADIANTUM CAPILLUS-VENERIS.—As this beautiful fern seems to be gradually extending itself to other counties than Cornwall and Devon, in which only (in England) it has been generally supposed to grow, I think it would be interesting to learn in what other localities it occurs. Your correspondent Mr. Grattann speaks of finding it near Clifton (St. Vincent's Rocks); I may add that it also grows at Portland, which, I believe, is a habitat not yet recorded, though it has flourished there for some few years. I have a specimen given me by a friend there in 1864, and last summer I found it in the same place, growing in a fissure of rocks by no means easy of access, and therefore not likely to be much disturbed, or nearly eradicated, as has been the case in some parts of Devon.—*S. M. P.*

VIOLETS.—In Jenner's "Flora of Tunbridge Wells," it is stated that *Viola flavicornis* (Smith, 2736 E.B.S.) occurs on the Common; but this plate is rightly referred to in Babington's "Manual" (5th edition) as giving *V. flavicornis* (Foster). I obtained in May, 1869, several specimens from the Common, where the plant was in abundance, thinking they were *V. lactea*. I am assured on competent authority that my plant is typical *canina*; an examination of the living plant *in situ* (it grows in the portion between the road to the High Rocks and that to Rasthall) would at once decide the point. I did not diagnose my specimens on the spot, nor examine them till some little time had elapsed after gathering them. The flowers are almost a pure white and scentless.—*R. T., M.A.*

FOXGLOVE (p. 43).—Mr. Britten's remarks under this head are very interesting. In the 2nd edition (1736) of N. Bailey's English Dictionary (assisted in the botanical part by P. Miller) the word is given as=Folag-glovan, *i.e.* folks-gloves; but in the 24th edition (1782), by E. Harwood, as=Fox-gloves. I wish now, however, merely to give two other names for the flower, which may be of use to him in the preparation of his paper on plant-names. In Polinius's "Flora Veronensis," vol. ii. p. 328, it is called *Cornocopio*, and in Jussieu's "Genera Plantarum," p. 135 (edit. 1791) *Fingerhut*. The former writer gives as Italian names for the *Bellis perennis*, Primo fiore, Protolina, Margheritina.—*R. T., M.A.*

ROSEMARY AND RUE (p. 39).—The Welsh name *Rhos Mair* for the former plant is, I believe, merely a translation of Rosemary; so translated, perhaps, from a fancied dedication to the Blessed Virgin. Gay writes "Butterflower," not "Buttercup," as quoted by Mrs. Watney. I can scarcely imagine that the Rue was ever placed in nosegays: its abundance in gardens and frequent mention in old books is rather to be accounted for by its popular repute in medicine than from any partiality to its scent. Mr. Holland, in SCIENCE-GOSSIP for 1867, p. 278, has given a full account of the manner in which the pollen is discharged.—*James Britten*.

BELLIS PERENNIS.—No record of the occurrence of this plant in Iceland is given in Hooker's Flora of the island; but a single specimen (*vide* Prof. Babington's very interesting paper on the "Flora of Iceland") has been detected amongst some flowers gathered by a gentleman who was not a botanist. A curious question (and one which may interest the readers of GOSSIP) has been started with reference to the appearance and disappearance of this plant simultaneously with the presence and absence of sheep. Some readers may, perhaps, be able to account for this, if in truth there be any connection between the two.—*R. T., M.A.*

## BIBLIOGRAPHY OF SAPROLEGNIACEÆ.—

*Pringsheim, N.*, Nachträge zur Morphologie der Saprolegnieen. Jahrbücher für wissenschaftliche Botanik, ii. p. 284 (1858); t. xix. xx. ii. p. 205, t. xix. (1860).

*Archer, W.*, On Saprolegniaceæ. Proceedings Dublin Microscopical Club, i. pp. 17, 97.

*Archer, W.*, On two New Species in Saprolegnieæ. Proceedings Dublin Microscopical Club, i. p. 123.

*Pringsheim, N.*, Monographie der Achyla proliferæ. Nova Acta Nat. Curios., xxii. p. 1, t. 50.

*De Bary, A.*, Einige neue Saprolegnieen. Pringsheims Jahrbücher, vol. ii. p. 169 (1860).

*Unger, Dr.*, Recherches sur l'Achyla proliferæ. Ann. des Sc. Nat., 3rd ser., vol. ii. p. 5 (1844).

*Thuret, G.*, Recherches sur les Zoospores des Algues Saprolegniées. Ann. des Sc. Nat., 3rd ser., vol. xiv. p. 229 (1850).

*Tute, J. S.*, Insect Moulds. Sci. Goss., 1865, p. 133.

*Griffith & Henfrey*, Micrographical Dictionary—"Achyla," p. 8 (1860).

*Braun, A.*, Rejuvenescence in Nature, pp. 188, 268 (1853).

*Robin, C.*, Histoire des Végétaux parasites, p. 372 (1853).

*Cienkowski*, in Botanische Zeitung, xiii. p. 801.

*Nageli, C.*, Zeitschrift für Wiss. Bot., i. p. 102, iii. p. 28.

The foregoing are the principal books and memoirs on this subject, inserted at the request of one of our correspondents.



## MICROSCOPY.

MY TANK.—In your number for December last you were good enough to insert a paragraph from me respecting the appearance of Melicertians in the dendritic form; these have since then disappeared, and floscules of a small kind, but in immense numbers, have taken their place, and have been increasing in my tank through the winter. Most of these have one or two eggs, and are continually multiplying. I may mention that I have also several species of the *Æeistes*, a tube rotifer mentioned by Mr. Slack in "Pond Life." In the same water I find numerous fine Stentors, also Vorticellæ, Amœba, &c. The water of my tank has not been changed for over six months, and the weed, principally *Myriophyllum*, was put in at the end of last summer, but the floscules appear to me to congregate principally on the algæ, which grow only far too rapidly. —George H. Fryer.

MUSCULAR MOTION. — Whilst examining the larva of some small beetle which is very common in running water, I had an opportunity of observing the mode in which muscular motion is propagated. The skin of the larva is so transparent, that the action of the muscular bundles moving the feet was seen with the greatest ease. At every movement of the foot, I could see that each muscular fibre was not contracted simultaneously; but the beginning of each fibre became swollen; then the swelling passed along the fibre in the form of a wave to the other end (fig. 66). As each *fibrilla* seems to con-

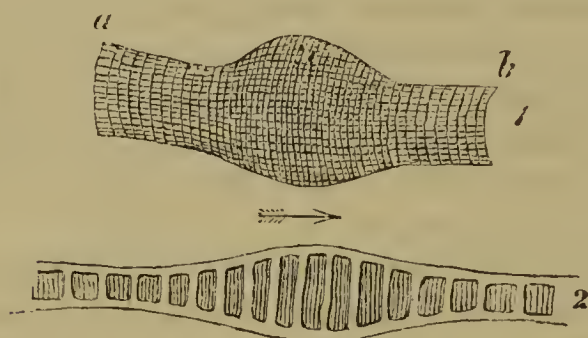


Fig. 66.

sist of a number of cells connected together in a transparent sheath, the muscular motion would appear to arise from the lateral expansion, and consequent longitudinal contraction of each consecutive cell. And the propagation of force through the muscular fibres seems, therefore, to follow the same law, and to produce similar effects as in other media. —J. S. Tute.

FORAMINIFERA IN FLINT.—Having made an excellent collection of *Foraminifera* from some chalk taken from the cavity in the interior of a flint nodule, I wish to bring it before the notice of your subscribers. All things relating to the formation of chalk are now of especial interest, in consequence

of the identity of forms recently found in the deep Atlantic dredgings with those of the fossil animalculæ of the chalk strata. In my collection, the shells are beautifully perfect, in consequence of their having been enclosed in the flint cavity; but the fact of their being in that position only proves that the flint, when a sponge, was surrounded by myriads of like forms, and that portion in the interior, when the animal perished and became slowly silicified, has been preserved from all pressure; and the forms now present themselves as beautiful and as perfect as an hour after their death. The substance taken from the flint was like the surrounding chalk, excepting that it was of very much less specific gravity: it is composed entirely of *Foraminifera*, spicules, and a few *Polycistina*. The forms most plentiful are the *Globigerina* and *Rotalia*, exactly identical with those of the deep-sea dredgings; so that it is a fair assumption that strata similar to those of the Hampshire chalk are now in process of formation at the bottom of the Atlantic. I have a small quantity of the chalk, which I shall be happy to share out amongst any who care to see it. —Arthur Angell, Jun., Secretary of the Winchester and Hants Literary and Scientific Society.

STARCH OF CALABAR BEAN (*Physostigma venenosum*).—We have received from Mr. Edmund Wheeler, of Holloway, a slide of this starch, prepared by him for sale, which is remarkable for its size, it being equal to that of "Tous-les-mois."

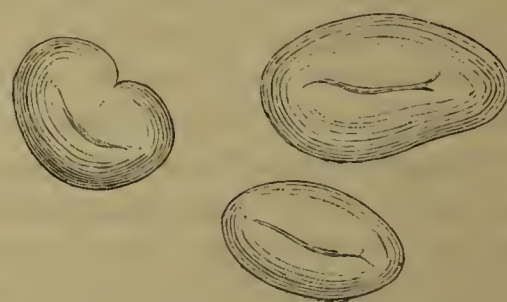


Fig. 67. Calabar Bean Starch, × 320.

The characteristic central slit, or hilum, is that of the bean tribe, by which, as well as by its polarization, it may easily be distinguished from any other known starch. It will be quite an acquisition to the microscopical cabinet.

RHODODENDRON SCALES.—Any one possessing a plant of *Rhododendron Dalhousii* will find on the under side of its leaves interesting scales somewhat similar to those of *Eleagnus*; but whereas those of *Eleagnus* appear in the microscope ragged at the margin, those of *R. Dalhousii* present a more unbroken circumference. —W. Hambrough.

RIVULET MOTH.—It may interest some readers to know that I captured a specimen of the Rivulet Moth (*Emmelesia affinitata*) at Partick, near Glasgow, last season: it was supposed to be unknown in Scotland or Ireland. —John M. Campbell.



## NOTES AND QUERIES.

BURGEONING.—In answer to your correspondent "R. Y. G.," I wish to state that the word "burgeon," as used by English gardeners, is only another name for a gem or bud. The French botanists distinguish three stages of its growth by three different names. At its first appearance in spring it is an eye (*œil*); about the solstice it becomes a bud (*bouton*), which continues to increase during the autumn; and in the following spring is called a *bourgeon* (bourgeon). The term "burgeoning" would therefore mean "putting forth their buds."—*E. Wilkins.*

WOODRUFF.—There may be some confusion between similar words:—1. Woodroffe, or Woodrough, a common surname, is apparently derived from the officer in charge of a wood: "the reeve of a wood"; A.-S. *gerefa* = governor; and almost equivalent to "wood-ranger." The German word *Wald-meister* Flügel renders "wood-ward"; which also is a common family name with us, and is explained by Bailey as "a forest officer," a species of rural constable. 2. The herb *Asperula odorata* has many names: *ex. gr.*, Wood-row, Wood-rowel, which may reasonably be explained by a direct reference to its scientific name, from *asper*=sharp; hence our word spur, and the rowel or wheel of a spur. It is also called Wood-roof, Wood-ruff. The word *asper* is also equivalent to *rough*, and some have said that the whorled leaves of this plant resemble the *ruff*, an article of dress.—*A. H. Gent.*

FONGLOVE (p. 6).—"When did reynard ever wear gloves, and such gloves as these?" asks Mrs. Watney. The truth is, however, that reynard has nothing to do with the word, which is a corruption of Folks'-gloves, gloves delicate enough and diminutive enough for the use of the "good folk," the fairies, I think; but I cannot now refer to any authority that in the earlier form of glove there was no division of fingers.—*W. W. S.*

WOODRUFF.—Without wishing to deprive W. W. Spicer of the pleasure in finding an origin for the "grand title" of "Lord of the Forest," given to this humble plant by the Germans, I may refer him to Chambers's Etymological Dictionary, in which he will find it defined as "a plant found in woods and shady places, with its leaves in whorls like *ruffs*."—*A. W. D., Seaham.*

WOODRUFF.—The general idea is, that the common English name of this pretty little plant refers to the whorled position of the leaves: they remind one of an old-fashioned ruff. Some people say the whorls are like the rowel of a spur, and hence the local names of "Woodrow" and "Woodrowel." The generic name comes from *asper* (rough), many of the species having rough foliage. Has Mr. Spicer ever heard the Woodruff called "*Stern Leberkraut*" in Germany?—*Helen E. Watney.*

BURGEONING.—Bürgen, to bud; to blossom. Burgeon, a bud.

"And therof sprang owt of the rote

A *burgon* that was feyre, and swote."

*Vide Halliwell, Archaic Dict., i. 220.*

The word is from A.-S. *beorgan*, "to protect"; compare *burganet*, "a species of helmet"; *ha-bergeon*, "a coat of mail." The *burgeoning* of a hedge would mean that it became clothed with verdure.—*A. H. Gent.*

BURGEONING.—In answer to your correspondent "R. Y. G.," Notes and Queries, February 1, 1870. I beg to refer him to the English Dictionary of N. Bailey, 1728, for the following:—

"To BURGEIN } [*bourgeon*, F., a tender sprig]

"To BURGEON } to grow big about, or gross."

There is another English word now in everyday use that is quite as difficult to be found in a modern dictionary as *bourgeon*, and that is the verb "to shunt, to shove." I have looked for it in numerous modern dictionaries, but always hitherto without success.—See N. Bailey, 1728.—*J. S. B.*

BURGEONING.—"R. Y. G." is requested to look at Sir Walter Scott's "Lady of the Lake," Canto ii., Stanza 19, where he will find the word used.—*J. C.*

THE RIBS OF THE DUN COW.—I have read with interest the correspondence in your journal with reference to the above subject. A few days ago I happened to look into the second volume of "Curiosities of Natural History," by F. T. Buckland, M.A., and in page 294 I found the following lines:—"The ribs of the Dun Cow at Warwick, and the gigantic rib at St. Mary's, Redcliffe Church, Bristol, are the bones of whales." Such a statement coming from one so high in authority as Mr. Buckland, who has had very great experience in the structure and anatomy of whales, would, I should think, be sufficient to prove that the bones in question are not those of a cow. In the course of Mr. Buckland's interesting account of whales, he mentions that he found whale bones in all parts of the country; some of them in very curious places. In naming some of the localities, he says:—"I also saw a large *scapula* of the whale hanging from the ceiling in the Seven Dials, London." Your correspondent Ulyett says he saw a *scapula*, which was called that of the Dun Cow, at an inn in Lincolnshire; but it seems more than probable to me that it was the bone of a whale, particularly as he was struck by its size. But supposing it to be certain that all these bones are those of a whale or whales, it still remains to be shown why the bones were placed in churches, and also why they were called those of the Dun Cow. It seems to me there is some old legend connected with the words Dun Cow, which I should like to see cleared up.—*E. G., Cardiff.*

GLOWWORM LIGHT.—For what purpose has the Glowworm its light? The reader perhaps will answer without hesitation that the light is given it for the purpose of attracting the male; but if this is a true solution of the question, how is it that the light is highly developed in the larva and the pupa, who know nothing of courtship or of sexes? Still more, how is it that there are numerous species of Lampyrids, both in Europe and North America, in which males and females are alike winged and alike furnished with the light-producing faculty? In Southern Europe, for instance, both sexes of *Colophotia* (or *Pygolampis*) *italica*, the *Stellæ volantes*, flying stars, of Pliny, exhibit a singularly conspicuous light as they dart here and there among the trees. Moreover, if this was the purpose of the light, why should it have been placed on a comparatively obscure part of the body, viz., between the abdominal segments, instead of on the upper surface, where, one would imagine, it would be more likely to catch the eye of the Leander of the hour, and where in fact it does appear in some of the torch-bearing beetles of tropical America. If, however, a soft though bright light were to be



supplied in order to exhibit its prey to the animal, as it crawls slowly over a grassy bank or on a sandy path, then we have just what is wanted in the case before us, where a bluish-green flame, not too glaring to confuse the possessor, yet bright enough for the purpose, scatters itself by reflection for a short distance around and in front of the animal. The whole question, however, is still in obscurity; nor is it yet determined what is the source of the light itself. It is certainly due in the first instance to a yellowish substance secreted between the plates of the abdomen; but experiment has hitherto failed in detecting exactly its nature and the cause of its luminosity.—*W. W. Spicer, Havre.*

CRYSTALS IN WASPS.—Your correspondent "H. W." appears to doubt the existence of the crystals in the poison-bag of the Wasp. In case Dr. Lewis Mills should not have time to give him information on the subject, it may interest him (or her) to know that I have seen them with my own microscope, Dr. Lewis Mills having had the kindness to lend me his specimen. The crystals were exactly as shown by him in the illustration of SCIENCE-GOSSIP for 1868; the forms distinct and perfect; the colours beautiful; but I believe that specimen to be unique, at least I have never succeeded in finding the crystals in any poison-bag I could buy, borrow, beg, or steal (if murdering a wasp and taking his bag may be accounted as the latter crime). If "H. W." can, I should be very glad to hear of it, and so, I think, would Dr. Lewis Mills.—*L. H. Farquhar.*

OVIPAROUS OR VIVIPAROUS.—At the request of the Asiatic Society, the Government of India made inquiries from all district officers about the habits of the Gangetic porpoise. One of the questions was whether it was oviparous or viviparous. On putting this question to some natives who happened at the time to be in the office, they replied that it was of course oviparous, as it had no visible ears. Is it true generally that animals without visible ears (*i. e.* large ears) are oviparous?—*S. G.*

WOODRUFF (p. 47).—I am inclined to fancy that the derivation of this, quoted by Mr. Spicer, is the correct one. Wood-reeve would closely correspond with *Waldmeister*; and the French *Reine des Bois* may be noticed in connection with them. The reason for the German name, at any rate, may be found in the great popularity of the plant, not only as forming the principal ingredient in the Maitrank (not Maitrauk), but also for use in wreaths, etc. This latter use appears to have been common in England; at least it is mentioned as if so by Gerard, who also tells us that the plant is called *Herzfrejdt*—heart's joy—in High Dutch; another name showing the appreciation in which it was held. In our beechwoods it is *Waldmeister* in another sense, being one of the very few plants which will flourish *sub tegmine fagi*. I have seen great patches of it in the Buckinghamshire woods. As to the derivation from Woodrowel, we must remember that it is by no means a modern one, and is therefore entitled to a little respect before discarding. Bosworth gives "Wudu-rofe, wood-rowel"; and Turner (1548) says that its leaves "represent certain rowelles of spores." Dr. Prior considers it a word "adopted into Anglo-Saxon from the French," and refers to *rouelle*, a little spur; but the modern French names for the plant do not bear out this derivation. The connection between *Asperula* and *Woodruff*, which might be spelt *rough*, is probably only accidental.—*James Britten.*

BEES ALOFT.—Last summer a swarm of bees having chosen to make their nest in the roof of our house, between the slates and rafters, I should be much obliged if you could tell me of any plan to get them down and induce them to go into a hive, and also at what time of year would be best to make the attempt.—*J. S. William Durham.*

FIREFLIES.—In last month's Gossip a story is given, taken from Kirby's "Introduction to Entomology," of Fireflies putting to rout the English adventurers under the command of Cavendish and Dudley. I take *Firefly* to mean *Elater noctilucus*; but were not the insects in question rather Lantern-flies—*Fulgoræ*?—*A. M. B., Birmingham.*

ADMIRAL (p. 21).—I agree with "C. S. B. G." in his remarks on this word. It is curious that a title originally denoting any "lord" or "chief," is now limited to the "commander of a fleet." The *al* by a usage common to the Hebrew, Arabic, and other Oriental tongues, goes with the following noun, *amir* being what is called the construct state of the word; so that *amiral* is "lord of the" fleet, or what not.—*R. T., M.A.*

FLORAL ANTIPATHIES.—The following from Johnson's "Cornucopiæ" (1595) are curious:—"Neither do plants, herbs, beasts and such like, want a certaine kinde of hatred or enmitie as we see Rubarbe hateth choller . . . The olive tree so detesteth the cowcumber that being placed nere together, they wil turne backe and growe hooke-wise lest they shoulde touche one another. Goates of all other herbes detest basill. All beastes doo detest the female Pimpernell and not the male"; and so on. Can Mr. Britten tell us what *priekmadam* is, which "floureth thrise every yeare"?—*R. T., M.A.*

FLORAL FINDINGS (p. 6).—"The Vine is greatly delighted with the Elme and yeeldeth more frute being placed together." (Thomas Johnson's "Cornucopiæ," 1595.) The passage in Milton is "Paradise Lost," book v. 215. The practice is referred to in Pliny, book xvii. cap. 23: "Prima omnium ulmus . . . deinde populus." Compare Horace's Epodes, ii. 10, and the poets generally.—*R. T., M.A.*

HODDY-DODDY (p. 21).—Since sending my former remarks on this compound, I have come across the following observations on the word in Richardson's Dictionary, which are to the purpose:—"Examples sufficiently ancient and various have not occurred to warrant even a conjecture as to the original meaning of these words. Holland renders *cochleæ* hoddy-dods or shell-snails; and these Bacon (Natural History, § 732) calls hodman-dods. In these words the *hod* may be *hood*, referring to the shell that covers them." The original, of which the two passages referred to above are translations, occurs in Pliny, book xvii. cap. 24.—*R. T., M.A.*

CATERPILLARS AT WORK.—I am sorry to say that I can sympathize with "D. J. S." in having found my plants ravaged by caterpillars at so unusual a season. At the end of January, observing some plants of scarlet geranium to be *fresh*-eaten to a considerable extent, I made diligent search, and found a specimen of the caterpillar of the Privet Hawk-moth in the very act of destroying the young leaves of geranium on a plant standing under the stage of our greenhouse.—*M. B. M.*



**SACKBUT.**—Bailey's Dictionary describes a sackbut as an "instrument of wind musick," and gives as its derivation "*sacar del buche*, Spanish, to fetch the breath from the bottom of the belly, because it requires a strong breath." If this derivation be correct, the sackbut must have been different from the sambuca, which is, I think, always considered to have been a "stringed" instrument of some kind.—*G. H. H.*

**ELM BARK.**—Although your correspondent "R. H. A." is mistaken in saying that Mrs. Watney, in "Floral Findings," described the bark of the Elm as highly "nutritious" (she said "astringent"), it is said that in Norway, in times of scarcity, the bark, after being dried and reduced to powder, has been mixed with meal to make bread.—*G. H. H.*

**IVY-LEAVED TOADFLAX.**—In answer to Mr. James Britten, of last month, I think that the plants of *Linaria cymbalaria* in the Kew Gardens must be the exceptional ones, for I have seen on several occasions, and in different localities, the twisted peduncle, just as stated by "W. W. S."—*J. Morley, Jun.*

**ADIANTUM RENIFORME.**—If *Adiantum reniforme* was found by W. H. Grattann at Torquay, I think it must have been planted there by some one who wished to try if such a fern would grow in our climate: and if such was any person's intention, Torquay would be one of the best localities for the experiment.—*J. Morley, Jun.*

**A SUGGESTION.**—When correspondents have occasion to refer to a paragraph which has appeared in SCIENCE-GOSSIP, may I suggest that they should quote page and volume? This plan is adopted in *Notes and Queries*, and would be a great saving of trouble to those who might be desirous of referring to all the notes upon any one point.—*James Britten.*

[We endorse the suggestion.—*ED. S.-G.*]

**"STUDIES FROM THE ANTIQUE"** (p. 45).—There is no necessity to refer back to the old authors for blunders in natural history. I extract the following from the *Journal of Horticulture* for Jan. 13th last. "A small tortoiseshell butterfly on the wing during Christmas day is, of course, unseasonably early. As it was in your drawing room, an egg, accidentally introduced, was artificially hatched by the warmth."—*James Britten.*

**CAUSE OR EFFECT** (p. 46).—There is a note in a recent number of *Notes and Queries* which bears upon Mr. Holland's remarks. "On a recent visit to the only farmer on Holy Island, which lies at the entrance of Lamlash Bay, Arran, N. B., I was much struck by his informing me that he can only keep sheep on the island for one year. It appears that they thrive very well during the first year, in fact so well that he obtains more than the average price for them when sold; but if he attempts to keep them beyond the first year, they pine and die. He attributes this to some peculiar herb which grows on the island." This would probably be *Pinguicula vulgaris* or *Hydrocotyle vulgaris*.—*James Britten.*

**THE FROG.**—Having observed many notices of the spawning of the frog as late as March in some districts, I should like to know whether this is the invariable rule in those localities, and if so, what is

the average temperature during the months of January, February, and March; as here, in the south of Devon and on the borders of Cornwall, I never fail to obtain spawn during the month of January, and this year I first saw it on the 14th. It would be a matter of some interest to zoologists to know whether the great difference in time is due to the temperature, or, if not, to what other local causes.—*C. Croydon, Devonport.*

**CRYSTALS OF WASP.**—In reply to "H. W." I beg to say that if he sends me his name and address, I will send to him the slide containing the *sting*, *poison-bag*, and *crystals* of the wasp. He will then have an opportunity of testing the accuracy of the statements I have made, and of examining the crystals so accurately figured in the illustration of my paper in SCIENCE-GOSSIP. The slide has attracted much attention, and on several occasions I have sent it for examination to readers of SCIENCE-GOSSIP. I only require that due care be taken of the slide, and that it be returned without much delay. As to my paper to which "H. W." refers, I have nothing to add to the statements I have made, and there is nothing in it which I desire to retract.—*Lewis G. Mills, LL.B., Armagh.*

**SNOW BUNTING.**—While shooting on the Felixstowe Marshes I procured several specimens of the Snow Bunting (*Plectrophanes nivalis*), and was informed that they had not been seen there for three years. Can any of your readers inform me if they are common elsewhere this winter?—*J. Mash, Jun., Ipswich.*

**THE GIPSY MOTH** (*Liparis dispar*).—Mr. Clifford's remarks in the February number of SCIENCE-GOSSIP have induced me to make the following upon the above-named species. In an old entomological work published in 1802, it is said that the species was first bred in this country from eggs sent to a Mr. Collinson from Germany. In what localities are the insects *now* found, in a *wild state*, or do we consider it a native of Britain from the fact that we are able to rear it from one generation to another? Like Mr. Clifford, I have set at liberty numbers of both larvæ and perfect insects. I first tried a quantity of very small larvæ, which I placed upon an apple-tree; but these, when about half-grown, were all devoured by sparrows and other caterpillar-loving birds. I next secured some larvæ from these attacks by placing gauze over the branches on which they were feeding, and in due course pupæ, and subsequently perfect insects, were produced. In the following season not a vestige of the species was to be seen in either of its stages, and as the same experiment has met with the same result in several successive years, I have come to the conclusion that our climate and insectivorous birds prevent *L. dispar* from living in a wild state, like "Gipsies" of a higher class. In France and Germany it is frequently reported that this insect is classed amongst injurious species, being so common and destructive. Then does it not seem strange that it refuses to live with us without nursing? Mr. Stainton in his "Manual" gives but two localities for the insect in Britain, and Mr. Newman, in his more recent "Moths," gives no locality at all; and yet we cannot consider the insect rare, as we could rear it every season if we wish to do so. It would be interesting to know whether the species *now* occurs at the localities indicated by Mr. Stainton—viz., Halton and Stowmarket,—and if not, whether it is found with us at all in a state of nature.—*G. B. C.*



## NOTICES TO CORRESPONDENTS.

ALL communications relative to advertisements, post-office orders, and orders for the supply of this Journal, should be addressed to the PUBLISHER. All contributions, books, and pamphlets for the EDITOR should be sent to 192, Piccadilly, London, W. To avoid disappointment, contributions should not be received later than the 15th of each month. No notice whatever can be taken of communications which do not contain the name and address of the writer, not necessarily for publication, if desired to be withheld. We do not undertake to answer any queries not specially connected with Natural History, in accordance with our acceptance of that term; nor can we answer queries which might be solved by the correspondent by an appeal to any elementary book on the subject.

C. F. T.—It is certainly not a good season of the year to go out collecting Desmids or Diatoms. Spring or autumn would be better.

P. F.—Mining larvæ. Only by picking off the leaves and burning them.

T. S.—Read the notice at the head of "Exchanges."

P. G.—We cannot tell without examination.

S. T. R.—We could not give space to answer all your queries. For stuffing birds, procure Gardner's "Taxidermy"; for mounting butterflies, &c., Knaggs's "Lepidopterist's Guide."

J. S.—The "vivarium" is made from designs, and the cost and style depend on the taste of the person ordering them. None are made up for sale, that we are aware of.

J. S. R.—The sweet-scented Butterbur is not so rare that we should record its stations. It is an "escaped" plant.

F. G., Seaforth.—The barren rooting portion of some species of *Polyporus*, formerly regarded as a "complete" fungus, under the name of *Rhizomorpha subcorticalis*.

G. S. T.—J. A. H.—We shall decline in future to insert "Exchanges" unless the names are written *in full*, and legibly. It is a slovenly habit which some naturalists affect.

J. B. R.—Lowne's "Anatomy of the Blow-fly" is published by Van Voorst (London).

G. B. C.—The Common Hare, Irish Hare, and Alpine Hare are all regarded by some naturalists as distinct species.

C. S. G.—You can either transfer them or replace the spirits without injury to the specimens.

F. E.—Hooker & Bentham's "Genera Plantarum" is published by Reeve & Co. Vol. I. is issued, and more to follow. The descriptions are in Latin.

G. F. C.—Your A and B is a *Stentor*, but what the others are we will not attempt to determine from a sketch.

R. R.—The lichens were, No. 1. *Parmelia perlata*, L.; and No. 2. *Parmelia saxatilis*, L.—W. C. C.

F. O. M.—It is the caterpillar of *Zeuzera Esculi*.—F. M.

BURGEONING.—All correspondents who forwarded replies not inserted will please to accept the Editor's thanks.

## EXCHANGES.

NOTICE.—Only one "Exchange" can be inserted at a time by the same individual. The maximum length (except for correspondents not residing in Great Britain) is three lines. Only objects of Natural History permitted. Notices must be legibly written, *in full*, as intended to be inserted.

FOSSILS from principal formations, from Lingula Flags to the Great Oolite, for fossils from formations above the Great Oolite, especially Tertiary.—Rev. C. Callaway, Wellington, Salop.

FOSSILS from various formations for Foreign Shells or Fossils.—F. D., Post-office, Faversham.

RARE BIRDS.—A few pairs of Mountain Finches or Bramblings in beautiful plumage for exchange.—G. L. Bailey, Shooter's Hills, near Longton, Staffordshire.

CRYSTALS OF SALTS for Polariscope, for Foraminifera, or Polycystina.—W. S., Farm Hill, Waltham Abbey.

FOR unmounted scales of Cobra, send stamped and directed envelope to H. S. B., Fulham Villa, Leamington.

SECTIONS of Hoof of Pig and Ox, and Hair of Polar Bear, Field-mouse, Mole, and Chinchilla (all mounted), in exchange for good mounted objects; Insects preferred.—C. Croydon, 20, Fore Street, Devonport.

WANTED, a good and pure gathering of *Pleurisma hippocampus* and *P. Balticum* for a liberal equivalent in first-class mounted objects.—E. W., 48, Tollington Road, Holloway, N.

LAND SHELLS (British and Foreign) given in exchange for British Eggs.—C. Ashford, Grove House, Tottenham, N.

PODURA.—*Lepidocyrtus curvicolis* (alive, or in balsam, and scales, dry) for decent slides or material. Send List.—Rev. John Hanson, 1, Bagby Square, Woodhouse Lane, Leeds.

MOLLUSCS.—Any of the following varieties of *L. peregra*, *lucustris*, *oblonga*, *lunata*, offered for *H. obvoluta*; *H. lamellata* for *H. Cartusiana*.—G. S. T., 58, Villa Road, Handsworth, Staffordshire.

COLEOPTERA.—*Pt. lepidus*, *Bem. rufescens*, *Rh. bifasciatum*, *Donacia crassipes*, &c., for Southern Coleoptera.—J. A. Harker, 85, Cambridge Street, Glasgow.

LIVING BRITISH PLANTS and Ferns offered in exchange for other living plants.—Send lists to A. D., Post-office, Dawlish.

ARCTIA VILICA.—Larvæ of *A. vilica* in exchange for other Lepidoptera.—Alfred Pickard, Wolsingham, Darlington.

WOOD SECTIONS.—70 varieties may be obtained for mounted specimens of fair character.—W. Paling, Newark.

FORAMINIFERA from Hampshire Chalk, and Diatoms from Guano (mounted) for any good mounted slides.—Arthur Angell, Jun., Friary Cottage, Winchester.

CORALLINES.—Twelve different named Corallines (nearly all of which polarize beautifully) unmounted, to be exchanged for six mounted objects.—C. E. Osborn, 28, Albert Road, Upper Holloway, N.

MINERALS wanted for others.—For lists and desiderata, address, J. W. Cotton, Perry Barr, Birmingham.

FINE LEAVES of *Elæagnus* (from large out-door specimen grown in Isle of Wight), and good specimens of *Dalhousii* leaf, sent in exchange for other interesting objects.—Rev. W. Hambrough, 40, Marine Parade, Worthing.

## BOOKS RECEIVED.

"Scientific Opinion." Part XV. February, 1870. London: Wyman & Sons.

"The Chemical News." Nos. 522 to 530. November, 1869, to January, 1870, containing Reports of W. T. Suffolk's Quekett Lectures on Microscopical Manipulation.

"Descriptive Catalogue of Flower Seeds offered for sale by William Thompson, Tavern Street, Ipswich."

"The Canadian Naturalist." New Series. Vol. IV. No. 3. September, 1869. Montreal: Dawson Brothers.

"The Body and its Health," a Book for Primary Schools. By E. D. Mapother, M.D. Second Edition. Dublin: Falconer.

"The Dental Register." Edited by J. Taft and G. Watt. December, 1869. Cincinnati: Wrightson & Co.

"The Journal of Applied Science." Edited by P. L. Simmonds. No. 1. January, 1870. London: Hailes & Co.

"Land and Water." Nos. 210, 211, 212, 213.

"The Monthly Microscopical Journal." February, 1870.

"Dust and Disease." Lecture delivered at the Royal Institution by John Tyndall, Esq., LL.D., F.R.S.

"The Gardener's Magazine." Part L. February, 1870. London: E. W. Allen.

"The Canadian Entomologist." Vol. II. No. 4. Toronto: Copp, Clark, & Co.

"The American Entomologist." No. 3. December and January, 1869-70. St. Louis: R. P. Studley & Co.

"Proceedings of the Bristol Naturalists' Society." Vol. IV. Part 2.

"Bristol Naturalists' Society, Annual Report, &c."

"List of Butterflies and Moths occurring in the Neighbourhood of Folkestone." With Copious Notes by H. Guard Knaggs, M.D., F.L.S. Published by the Folkestone Natural History Society.

"Proceedings of the Literary and Philosophical Society of Manchester." Vol. X. No. 10.

"On a New Method of Adjusting the Focus of Microscopes." By Thomas Fiddian, Member of the Birmingham Natural History and Microscopical Society.

COMMUNICATIONS RECEIVED.—E. B.—W. W. S.—G. L. B.—P. F.—T. S.—P. G.—H. E. W.—A. H.—W. S.—E. W. (yes).—J. C.—L. H. F.—C. C.—E. L. H. F.—W. H. B.—M. C.—J. S. B.—H. M.—L. M. P.—S. G. (no).—A. E. B.—J. S. W. D.—W. H.—P. T. R.—J. S.—E. G.—J. W. M.—H. U.—G. W. G.—G. H. F.—W. T. W.—A. W. D.—H. A.—J. C. D.—G. H. H.—R. T., M.A.—H.—G. B. C.—J. S. R.—F. T.—G. G. M.—J. L. M.—J. B. R.—S. W. B.—G. F. C.—F. E.—A. M. B.—H. S. B.—W. H.—C. C.—J. R. P.—J. A. H.—J. H.—R. W.—J. M. C.—J. M., Jun.—G. S. T.—E. W.—B. H.—C. A.—T. R.—S. M. P.—B.—F. G.—A. E. B.—C. S. G.—W. P.—E. T. C.—E. T. S.—A. D.—G. L. P.—E. W.—S. S.—A. P.—W. W.—S. G.—F. B.—M. B. M.—C. H.—J. T. H.—T. P. B.—J. W. C.—R. R.

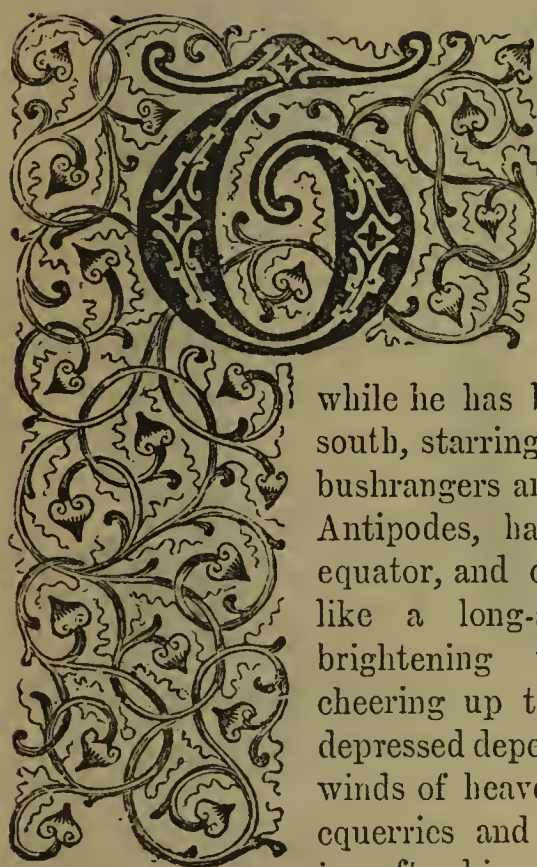




## LORDS-AND-LADIES.

(*Arum maculatum*.)

By MAJOR HOLLAND, R.M.L.I.



HE Vernal Equinox has arrived, and King Sol, of whom we have seen so little during the last six months,

while he has been away down south, starring it amongst the bushrangers and Maoris in the Antipodes, has recrossed the equator, and come back to us like a long-absent landlord, brightening the faces and cheering up the hearts of his depressed dependents. The four winds of heaven have been his equerries and outriders, dashing after him, full cry, into this

northern hemisphere—whew—how they howl round our chimneys at night, and rattle the loose slates and tiles, and rant and tear about amongst the ricks and sheds of the farmsteads; how they drag the thatch off, and send the straw whirling all over the country; how reckless they are about the poor sailors out at sea, and what shocking liberties they take with hats, wigs, umbrellas, and petticoats at the street corners,—yet we are all glad that they are come, these wild March winds, the boisterous heralds of the welcome Spring, rousing the hibernating Flora of these chilly British Isles from her frosty slumbers, and making her blush to find the kindling rays of the great life-giver beaming brightly upon her.

The stately fast-rooted forest trees, like other sedentary stay-at-home people, are all the better for a good blow, a little compulsory out-of-door exercise, which awakens their dormant energies, long steeped in a lethargic winter sleep, and sets

No. 64.

the sap flowing through their tissues, just as a gallop across country sends the warm blood dancing and bounding through our throbbing veins; how they sway their strong trunks this way and that way, how they whirl and toss their long arms about in all manner of mazy contortions, like young ladies going through their “calisthenics”; it quickens their pulses, it helps on and upwards the vigorous flow of the vital juices, and dame Nature dons her green kirtle in this merry spring-time.

Amongst the earliest plants of our banks and hedges, our young folk are sure to descry the rich rank spotted sagittate leaves of the wild *Arum*, commonly known as the Cuckoo-pint, Wake-robin, or Lords-and-Ladies, the latter name being perhaps that with which our young friends are most familiar. Let us take our fern-trowel, and digging well down into the light soft vegetable mould of this steep bank in this deep old country lane, take up this specimen, root and all.

Here (fig. 68) we have (*a*) the fleshy *corm*, which we are apt to call the root; but we must remember that it is not a root, but a true underground stem. Practically, a corm may be distinguished from a bulb by its being solid, whereas a bulb is formed of imbricated scales: the corm is known to be a form of stem, by producing from its surface one or more buds. This convolute leaf (*b*) will unroll in a week or two, and display itself as a sheathing bract, or *spathe*, enveloping the *spadix* and its remarkable cluster of flowers. “The hooded spathe of the order of Arads affords a character not to be mistaken, and, connected with their dielinous naked flowers, gives them their most essential diagnosis: an acrid principle generally pervades this Order, and exists in so high a degree in some of them as to render them dangerous poisons.” We might almost fancy we were writing of the cobra, or the puff-adder, whose spectacled hoods give them their very unmistakable diagnosis, and to the spectator



a warning to beware of the terrible venom which "pervades the Order."

Although the poison of this common Cuckoo-pint of ours is chiefly concentrated in the corm, death has resulted from eating the leaves. (*Vide* Stephenson and Churchill's "Medical Botany," vol. i.) One almost wonders how the children



Fig. 68. *Arum maculatum*,  $\frac{1}{2}$  nat. size.

who thus victimized themselves could possibly have swallowed the acrid fiery stuff, which causes a most painful burning and benumbing sensation in the tongue and throat, if the inside of the mouth be only touched with a bruised leaf or broken stalk.

Unrolling the hood we behold the spadix (*a*). "The spadix is a spike with a succulent axis, in which the individual flowers have no bracts, but the whole inflorescence is enclosed in a long bract called a spathe"; perhaps our simplest plan is to regard it as an elongated flower-stalk or primary axis, bearing two sorts of flowers of the simplest kind, both destitute of calyx and corolla, and with the aforesaid axis considerably prolonged beyond the inflorescence. At the base of this central stalk (fig. 70) we have (*b*) a cluster of fertile pistils surmounted by (*c*) a frill of one or two rows of

rudimentary or 'aborted' organs of the same kind; above these we come to (*d*) a group of perfect sessile stamens, and higher still another frill (*e*) of these last-named organs in a rudimentary or aborted state. In the days of our childhood we used to cut these curious stalks off close down to the sheath of

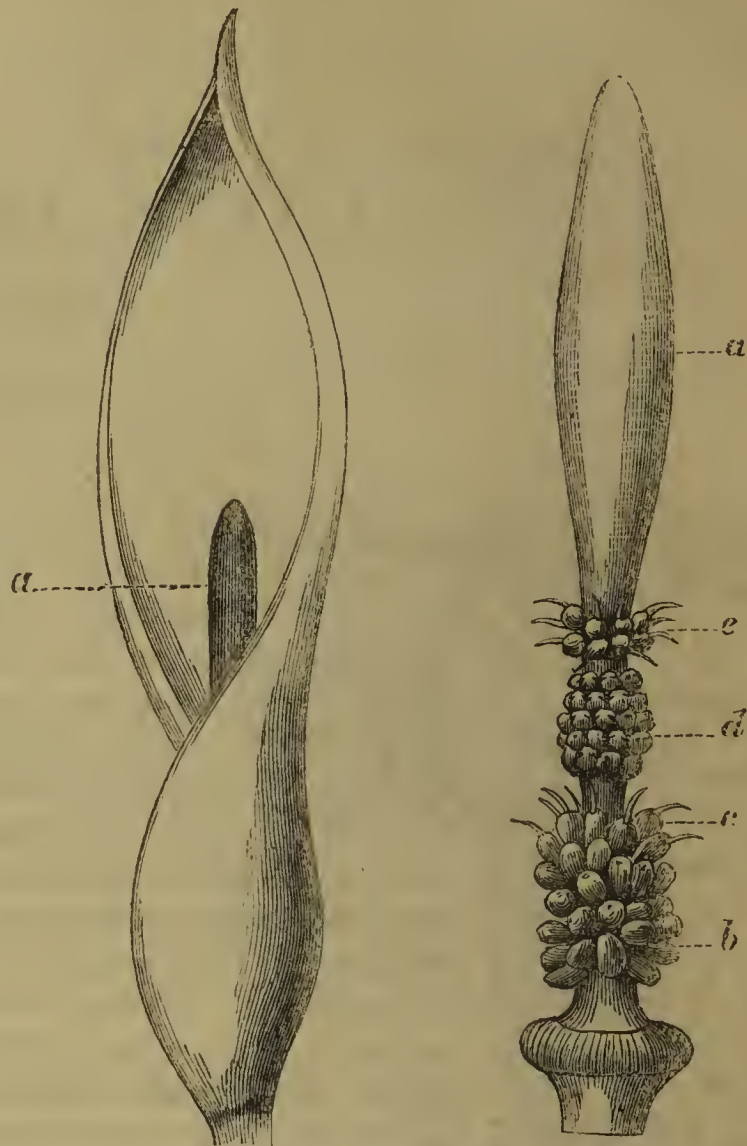


Fig. 69. Spathe of *Arum maculatum*, after Lindley, nat. size.

Fig. 70. Spadix of *Arum maculatum*,  $\times 3$ .

the hood, and to stick them in flowerpots filled with sand, with the club downwards; the red and the purple ones we dubbed Lords, and the yellow and the white ones Ladies; the bead-like pistils made the coronets, and the aborted appendages constituted the ruffs and collars,—the *tout ensemble* being not unlike the kings and queens of a set of old English ninepins. We were always told that this general resemblance to the ninepin aristocracy had won for these harbingers of spring the popular appellation with which this brief notice of them is headed.

If we take a plant early in the season, and place the *gynaceum* thereof under the microscope, the perfect female flowers will be seen to be of the form shown in fig. 71, while the aborted contingent will resemble fig. 72. It will be remarked that in these immature examples the fertile and the sterile organs are of precisely the same size, but in a later stage the growth of the barren members is arrested; the aborted pistil seems to differ from the perfect form only in the stigmatic tuft being protruded, or



transformed into a kind of horn, instead of remaining in its normal position in a slight depression; it looks like a case of *prolapsus*, if one may venture upon an analogy with the animal kingdom.

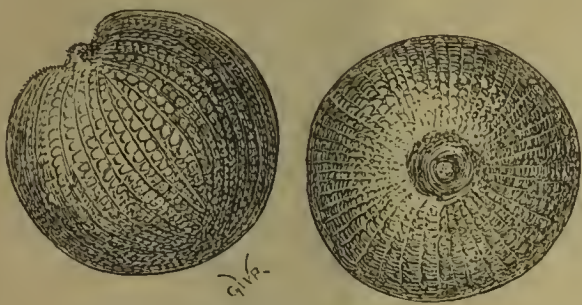


Fig. 71. Fertile Pistils,  $\times 25$ .



Fig. 72. Aborted Pistil.

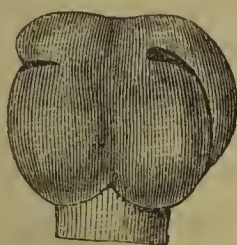


Fig. 73. Perfect Stamen.

Fig. 73 represents a perfect stamen. The order of arrangement of these several parts is not constant, as any one may easily be satisfied by examining a dozen or two of the plants: soil, situation, aspect, and other conditions seem to affect these *Arads* as well as other things. Imperfect female flowers will often be found intermingled with the fertile zone, while the "neuters," like people without votes, are "wholly unrepresented" in the *andræceum*.

Why is *Arum maculatum* or any one of its family supplied with two sets of apparatus, of which the one is apparently useless? Can any one answer our query? Probably nobody can solve the riddle; but we get some vague and indistinct notion of a law of uniformity running throughout Nature—like the pawnbroker, she rejoices in duplicates—Why is the domestic hen provided with a pair of oviducts, of which one (usually the right) is invariably aborted? If you want a greater example, said a friend of ours, if you would like to take a big thing that everybody can see, take the Narwhal (*Monodon monoceros*), in which the young animal is provided with the rudiments of a pair of tusks, but one of them almost invariably remains undeveloped in the alveolus, whilst the other grows to a length of ten or twelve feet. No one on earth can tell which of the two will be the one that will sprout: it would be a fine thing for betting men to speculate upon; they might make a big tank at Tattersall's, and stock it with young Narwhals for "greenhorns" to make books upon.

The singular structure of this inflorescence induced Darwin, in his attempt to personify the salient points of the vegetable kingdom, to speak of

these spadices as examples of "masculine ladies," dangerous beauties to dally with; and he compares our little hedge plant with its clavate spadix to Dejanira, the terrible spouse of Hercules, wielding the hero's club.

"With net-wove sash and glittering gorget dressed,  
And scarlet robe lapell'd upon her breast,  
Stern *Ara* frowns, the measured march resumes,  
Trails her long lancee, and nods her shadowy plumes;  
While love's soft beams illumine her treacherous eyes,  
And beauty lightens through the thin disguise.  
So erst, when Hercules untamed by toil,  
Own'd the soft power of Dejanira's smile;  
His lion-spoils the laughing fair demands,  
And gives the distaff to his awkward hands;  
O'er her white neck the bristly mane she throws,  
And binds the gaping whiskers on her brows;  
Plaits round her slender waist the shaggy vest,  
And elaps the velvet paws across her breast.  
Next, with soft hands the knotted elub she rears,  
Heaves up from earth, and on her shoulder bears.  
Onward with loftier step the beauty treads,  
And trails the brinded ermine o'er the meads;  
Wolves, bears, and pards forsake the affrighted groves,  
And grinning Satyrs tremble as she moves."

The medicinal part of the plant is the corm, which in a recent and lactescent state is extremely acrimonious; this acrimony, however, is gradually lost by drying, and may be so far dissipated by the application of heat as to leave the corm a bland farinaceous aliment. "In this state it has been made into a wholesome bread: it has also been prepared as starch; dried and powdered it is used by the French to wash the skin with, and is sold at a high price under the name of Cypress Powder; it is undoubtedly a good and innocent cosmetic. Its medical efficacy lies wholly in the active volatile matter; consequently the powdered root loses much of its efficacy, a circumstance which has caused the omission of *pulvis ari compositus* from the latest editions of our Pharmacopœia."

Warzel, a German physician, administered the powdered root to dogs, and it killed them in twenty-four hours.

Whether the volatile principle in which the poison appears to be contained is in abeyance in winter when the sap is down, or whether birds can eat this poison, as we know they can take some others with impunity, we cannot say; but Gilbert White, who was too good an observer to be likely to have made a mistake, states in his "History of Selborne," that the roots of the *Arum* are scratched up and eaten by thrushes in severe seasons.

Lindley tells us that the corms of the *Arum maculatum* are commonly eaten by the country people in the Isle of Portland; they are macerated, steeped, and the powder obtained from them is sent to London for sale under the name of Portland Sago. The said sago appears to be chiefly used in the manufacture of hair powder; and to the fact of the latter article and sundry cosmetics prepared from it having been in great repute in former days



amongst "the upper ten," some people attribute the origin of the popular name Lords-and-Ladies. We stick to the ninepin theory.

Pereira in the edition of his "Materia Medica," published in 1855, states, on the authority of Mr. Groves, that "scarcely any Portland arrow-root is now manufactured; the yield, according to his informant (an old woman and the only arrow-root manufacturer now on the island), is three pounds from a peck of roots." It is further stated that "the fresh plant is an acrid poison, causing burning and swelling of the throat, vomiting, colic, diarrhoea, and convulsions; medicinally the tubers were formerly used as diuretics in dropsies, and as expectorants in chronic catarrhs."

Varieties of the *Araceæ* are cultivated for food in many parts of the world; in Bengal the *Arum campanulatum*, called "Ol" by the natives, is so largely used and so valuable as to "deserve to be called the Telinga potato"; in the South Sea Islands whole fields of *Colocasia macrorhiza* (the "Kopeh," or "Tara" of the natives) are to be seen. The cooked corms form a staple article of food, in a raw state they are desperately poisonous. We well remember one day (lang syne) a dear and trusty friend of ours being very much delighted by discovering a representative of his old familiar Tara-root, of the charming and fertile island of Tahiti of pleasant memory, growing amongst the granite rocks that frown behind the village of Shekpei-wan, in that arid, sterile abomination of desolation the island of Hong-Kong, and having incautiously, in describing the way in which it was eaten by the people in the Pacific, touched the bruised root with his tongue, the latter became so terribly swollen, and the upper part of the throat so completely paralyzed, that we were alarmed for his life, and he remained unwell for days after the shock.

We beg to submit another of this tribe, the West Indian Dumb-cane (*Dieffenbachia seguina*), for the consideration of hen-pecked husbands afflicted with curtain lectures, &c. "The Dumb-cane, when applied to the tongue, possesses the remarkable property of destroying the power of speech."

The *Arum maculatum* is perhaps the most remarkable among plants for the amount of heat evolved by it at flowering time. During the expansion of the spathe Senebier found that its temperature rose to 15° F. above that of the atmosphere; while Dutrochet measured it from 25° to 27°. Hubert states that in the Isle of France, in experiments made upon an Arad (*Colocasia odora*), a thermometer placed in the centre of five spadices stood at 131° F., and in the centre of twelve at 142½°, while the temperature of the air was only 75° F.

Although the flowers appear so early in the spring the fruit does not ripen till late in autumn. The hood has then shrunk up to a mere remnant, the leaves

have dwindled away almost to nothing, the stamens and frills and Dejanira's club have withered and fallen, and only the fertile pistils turned into fruit



Fig. 74. Ripe fruit of *Arum maculatum*, nat. size.

remain; they are then of a bright orange, or sometimes of a flaming red colour, conspicuous amongst the less brilliant tints of the hedge-growth: so little resemblance does the plant bear at that season to the hooded beauty of April and May, that children often ask what are those bright berries growing on the bank, and are amazed to find that they are the seed, or more strictly speaking the 'fruit, of their springtide friends, the Lords-and-Ladies.

*Bury Cross, Gosport.*

#### THE COLOUR OF INSECTS AFFECTED BY HIBERNATION.

INSECTS, as is well known, may be made to hibernate, whether they like it or not. The experiments of Réaumur and others have taught us that the exit of the complete insect may be retarded almost indefinitely by keeping the chrysalis in ice, or, in other words, by reducing it to a state of involuntary and altogether abnormal torpidity. Duponchel, however, has shown, that during the condition of hibernation, structural changes of great importance take place. His experiments—repeated, as he assures us, and confirmed by Boisduval—had for their object, in the first instance, to ascertain whether two butterflies, *Vanessa prorsa* and *V. levana*—unknown in England, but not uncommon on the Continent—should be combined under a single species. The interesting circumstances are best related in M. Duponchel's own words (*Dict. Univ. de l'Hist. Naturelle*):—

"It was for a long time believed that these two butterflies form two distinct species, mainly on account of the extraordinary difference in colour; the



base of the wings on the upper side being brown or nearly black in *V. prorsa*, whereas in *V. levana* the same part of the wing is rufous. I ascertained, however, that the one is in reality but a variety of the other, in the following manner. Out of a certain number of chrysalids taken from the same brood of caterpillars in the month of June, some were permitted to develop into the perfect insect at their proper date, viz. in July, while the remainder were deposited in a cellar in order to retard their maturation until the following spring. These last produced the rufous variety, while in the former the colour was brown or black. One may conclude from these experiments that the Dark-wing (*prorsa*) should be accounted the type of the species, and that the Rufous-wing (*levana*) is simply a variation brought about by the influence of the cold to which the chrysalis was submitted during the winter—a variety in fact become constant by the annual repetition of the exciting cause.

"It is invariably the case that *Vanessa levana* shows itself only in the spring, that is to say, towards the end of April, and then in small quantities only, and that it does not appear later in the season. And it is equally a fact, that *prorsa* shows itself for the first time in the month of July, that it appears in much greater numbers than the former, and continues to be found throughout the remainder of the summer. Thus the Black-wing (*prorsa*) is necessarily produced from eggs deposited by the Rufous-wing (*levana*), which hatch in June; and the rufous come from eggs deposited by the Black or *prorsa*, which hatch in August or September, and the larvæ of which pass through the winter as chrysalids."

The author's conclusions are illustrated by a circumstance, which, as he avers elsewhere, is of unvarying occurrence.

It has reference to a beetle (*Cassida murra*) sometimes found in England, and widely distributed over France and Germany. Of this species there are two well-known and well-marked varieties, one green and the other red. Such variations of colour are not unfrequent; but the point of interest here is, that "the green insect always comes forth in spring, whereas the red does not show itself until the middle of summer. This difference of colour appears to arise from the same cause which affects the two butterflies spoken of above."

Havre.

W. W. SPICER.

BRITISH FUNGI.—Mr. M. C. Cooke will be glad to receive notices of the occurrence of any rare species, not already recorded in "Seemann's Journal," or the "Annals of Natural History," with specimens (as a guarantee of accuracy) wherever possible. They are required for the "Handbook of English Fungi," which is intended to be published towards the close of the present year.—Address to 192, Piccadilly, W.

#### ABOUT THE ELM-TREE.

I AM quite sure the readers of SCIENCE-GOSSIP would protest against the points at issue between Mrs. Watney and myself becoming an Elm controversy, and I by no means desire or intend that they shall become one; but as I "attacked" Mrs. Watney's statements, or rather her knowledge, respecting the fruiting of *Ulmus campestris* and other matters, and asserted what I believed to be a truer history of the facts, and as my own assertions are now called in question in this and other magazines, I must crave a page or two of space, lest I may be thought to have "attacked" Mrs. Watney in a too arbitrary manner.

The reason I wrote about it at all was, that I believed Mrs. Watney had strung together the descriptions of a few plants, instead of telling us her real experiences, as her paper stated, and that she had betrayed herself by placing plants together that were not *generally* found at the same time; and I thought that a lady with Mrs. Watney's undoubted talents and knowledge of Natural History was quite able to give us a little more of the science and a little less of the gossip. If Mrs. Watney had said at first, what she has now said, that she had not really arranged her flowers together in a real vase, I do not think I should have been so ungallant as to have attacked her. But now, I have no doubt, both Mrs. Watney and I have, during the last few weeks, been studying the natural history of the Elm a little more closely than we ever did before; and I dare say we are none the worse botanists in consequence. I have been working up the subject a little, and I wish to lay before the readers of SCIENCE-GOSSIP the results of my investigation.

The number of British species into which the genus *Ulmus* is and has been divided by botanists varies very greatly. In old times, Evelyn (who wrote his "Sylva" in 1678) says:—"Of this there are four or five sorts, and, from the difference of soil and air, divers spurious." But he most particularly speaks of two sorts, and these he calls "the Vulgar, or Mountain Elm," and the "French Elm." Therefore, in his time, it would seem, that there were recognized two principal species, or, as he would have called them, "sorts,"—a native species and a foreign species; and this is of some importance, because it, in a certain degree, affects the question of producing perfect seed or not. Dr. Hunter, who edited an edition of Evelyn's "Sylva" in 1776, in his copious notes to that work, enumerates six "kinds" on the authority of Mr. Miller. From the descriptions, these are evidently what we should now call varieties of one or two species. I will not copy his descriptions, which would take up too much space, but will enumerate his names, as the English synonyms are rather peculiar:—



1. *Ulmus (Campestris)*. The common rough, or broad-leaved Wych Elm.

2. *Ulmus (Scabra)*. The Wych Hazel, or rough and very broad-leaved Elm; *by some unskilful persons called the British Elm*.

These two are apparently varieties of what we now call *Ulmus montana*, and in English "Wych Elm."

3. *Ulmus (Sativa)*. The small-leaved or English Elm.

4. *Ulmus (Glabra)*. The smooth-leaved Wych Elm.

5. *Ulmus (Hollandica)*. The Dutch Elm.

6. *Ulmus (Minor)*. The smooth narrow-leaved Elm, by some called the upright Elm.

These four apparently correspond with what we now call *Ulmus campestris* (Sm.) or *suberosa*, and in English, common or English Elm.

Sir William Hooker, in his "Flora," enumerated seven species on the authority of Lindley, but said, "With the English species of this genus I confess myself not well acquainted; and Scotland, so far as I can ascertain, possesses but one really native kind, the broad-leaved Elm, *Ulmus montana*." Babington admits only two species. These he calls,

1. *Ulmus suberosa* (Ehrh.), Common Elm, which includes *U. campestris* (Sm.), and *U. glabra* (Sm.).

2. *Ulmus montana* (With.), Wych Elm.

Bentham also gives two species,—

1. *Ulmus montana*, Wych Elm.

2. *Ulmus campestris*, Common Elm, which corresponds with Babington's *suberosa*.

Now, it will be seen at a glance that there is some confusion between the names of the two species of Elm. The older writers, including Linnaeus, called that species *Campestris*, which we now call *Montana*,—the Wych or so-called Scotch Elm; but the *Campestris* of most modern botanists is the other species,—the common or so-called English Elm; and this confusion is increased from the fact that Hooker and Arnott, in their "British Flora," have returned to the old name for the Wych Elm, and have called it *Campestris*.

But most botanists would certainly recognize the two species of Elms by the following names,—

*Ulmus campestris* or *suberosa*, the common or English Elm.

*Ulmus montana*, the Scotch or Wych Elm.

Nurserymen generally distinguish them as English and Scotch Elms, because the former is found (if it be found wild at all) chiefly in England; the latter being found growing, apparently really wild, in the north of England and in Scotland. Without referring to the more minute differences of leaves, flowers, and seeds, the two trees are recognized at a glance. When young, *U. montana* has perfectly smooth bark, as smooth as that of a lime-tree, which only becomes slightly reticulated when the stem is about six or seven inches in diameter. After that it

gradually becomes more rugged, until in a full-grown tree it is as rough and furrowed as the bark of an oak. Even then the branches are perfectly smooth. *U. campestris*, on the other hand, has always a rough stem, and the roughness extends even to the moderately small branches. This character of *Ulmus montana* is not much noticed in modern botanical books, but it is one of the best distinctions I know. Old trees also can be readily distinguished at a glance by the form of the branches, which in *Campestris* grow without any regularity of arrangement, but in *Montana* are remarkably flat, spreading out almost like a fan. Another noticeable distinction is seen in the arrangement of foliage; in *Campestris* the stems and large limbs are generally plentifully covered with small leaf-bearing twigs, which are never seen in *Montana*. It is this peculiar habit in the former species which gives it such an appearance of full foliage, and makes the English Elm such a particularly ornamental tree. Then, again, they affect different situations. The English Elm is seldom seen except where it has apparently been planted, in hedgerows, in avenues, or as single trees in parks; it is seldom or ever a sylvan tree; whilst the Wych Elm is more frequently seen in woods, where it certainly often comes up spontaneously, and probably from seed.

*Ulmus montana* produces an immense quantity of reddish flowers, which come out before the leaves, and which are succeeded very quickly by bunches of seeds, called in the books "hop-like." These fall off and strew the ground about the time the leaves are coming out; but, as Mrs. Watney describes, some remain upon the branches until the leaves are partially expanded. I have not proved it, but I suspect the greater portion of these seeds are abortive, and any that are fertile remain upon the tree a little longer. *Ulmus campestris* flowers a little later, but in my experience, not nearly so freely, nor does it produce anything like the same quantity of seeds, be they ripe or abortive. Mrs. Watney has several times spoken of *Ulmus campestris* as "the common elm of our woodlands," but as that species is pre-eminently *not* a sylvan species, I cannot help thinking that she may have really been referring to *montana*. One of my assertions was that *Ulmus campestris* seldom, if ever, perfected, *i.e.* ripened, its seed. This has been contradicted in the *Journal of Horticulture* by a correspondent, who says he has seen young plants grown from seed, and has superintended the planting of them out. Unless this gentleman has also confused the two species, I must, of course, believe that it does occasionally ripen its seed; still I wish he had added where the seed came from. My reasons and authorities for believing it to be a very exceptional circumstance are not without considerable weight. In the first place, it is a foreign tree. Evelyn calls it the "French Elm." Dr. Hunter



says that it is "not a native of England," that it is "supposed to have been brought from Germany," and is never found wild. This is one reason why it is not likely to produce much ripe seed; but Dr. Hunter adds: "I could never observe any seeds upon this sort." Grindon in his "British and Garden Botany" says of it: "Central and Southern and Eastern Europe, and Western Asia, are its aboriginal localities, and although apparently wild in England, it is only from long residence. A good test of a plant being really indigenous to a given country is its ability to multiply itself there naturally from seed, or without the assistance of man. This power is possessed by the *Ulmus campestris* only in a very slight degree."

But I have asked the opinion of several of the principal nurserymen in England. I am not at liberty to mention their names, but they are men of well-known reputation. I asked them the following questions:—

Does the so-called English Elm (*Ulmus campestris*), in your experience, ripen seed in England? If so, in the North as well as in the South?

Does it do so generally and freely?

If seed be procurable, why do nurserymen propagate it by grafting on to stocks of the so-called Scotch Elm (*Ulmus montana*)?

My first correspondent answered me as follows:—"In respect to the English Elm bearing seed, I have never seen it do so, nor have I heard of it doing so. If we could procure the English Elm from seed, it would be more reasonable in price than it is, and *save poor nurserymen a deal of trouble in grafting and budding.*"

An answer from a *very* large firm came to me this morning. It runs as follows:—"It very rarely ripens seed in England; but in our experience it has done so in the South, near Wimbledon, where we remember, many years ago, seeds having been blown from some old trees and brairding freely in an old kitchen garden. We do not know of any instance in the North. It ripens its seed freely in the South of Europe, and some parts of Asia, where it is indigenous; whence we procure seeds and raise large quantities of seedlings every year nearly." They add that "seedlings are of much slower growth than grafted trees; not so soon marketable; and often produce variation in habit and foliage."

I think I need add no more to show that I was justified in saying that *Ulmus campestris* very rarely perfected its seed in England.

ROBERT HOLLAND.

March 5th, 1870.

"AMERICAN NATURALIST."—The first number of the fourth volume of the *American Naturalist* has just reached us. It is quite up to the standard of its predecessors, and we wish it every success.

## THE CULTIVATION OF MUSHROOMS FROM SPAWN.

MUSHROOMS are grown artificially in hotbeds in different ways, and we proceed to indicate the means generally adopted, and the precautions necessary to be observed:—

1st. The preparation of the manure destined to form the hotbed.

2nd. The formation and management of the bed.

### PREPARATION OF THE MANURE.

A very important matter is this, and on its judicious management success entirely depends. Nearly all the failures to procure mushrooms arise from ignorance on this point. It may be performed in all seasons, but success is more certain in spring and autumn than at other times.

Take good horse-manure proportionate to the number of hotbeds required, giving preference to that from draught or working horses. Draw the fork through it to extract the long straw and hay, and take care to remove dirt or any other unsuitable substance.

Let the ground selected for forming the bed be smooth and fresh, and be protected from the incursions of poultry. On it deposit the manure in a heap four feet high. Length and width optional.

After well pressing or stamping, leave it level, but with a surface like the markings on a millstone. If in summer, and the weather be dry and hot, wet the heap abundantly; in the contrary case, do not water at all. The manure should neither be dry nor too moist. At the end of eight or ten days, when it has fermented briskly (which is known by the white colour of the interior, and is even noticeable on the surface), the whole heap should be turned and reconstructed on the same spot, taking care to place all the manure that was on the outside in the interior of the heap, together with any portion that may not have undergone equal fermentation. The bed must again remain eight or ten days, at the end of which time it will have gained nearly as much heat as at first. Again it must be turned as previously; and, in about five or six days, the manure acquires the degree of mildness requisite.

It is not always easy to judge when the proper condition has been reached, but it is essential; and this it is which makes practice almost indispensable; for on proper discernment at this stage rests the ultimate success of the bed.

When the manure has become odourless, is of a brownish colour, binds well, is soft, and on being pressed does not give out any water, then it may be considered good. If it will not bind, or is plashy and wet, it has not arrived at a suitable state. In the first instance it must be moderately moistened and turned about, but in the second the superabun-



dance of humidity will in all probability have spoiled it, and it will be better to recommence.

One frequent cause of failure in the attempt to cultivate mushrooms arises from the very small quantity of manure used for the experiment. It may easily be imagined how much more difficult it is to obtain an equal fermentation in a very small bed, which is influenced on all sides by the atmosphere, than when a bed of considerable size is formed; it is therefore recommended that a larger quantity be prepared than would be required for the formation of the mushroom-bed. The portion not used may be employed for ordinary purposes without having undergone a perceptible deterioration in its fertilizing quality.

#### THE FORMATION AND MANAGEMENT OF MUSHROOM BEDS.

The manure having reached a proper condition, the spawn should be introduced. In spring and summer the bed should be situated in the shade, in autumn and the beginning of winter a southern aspect; but in all seasons it is best in a cellar or other sheltered place, well closed in and darkened.

The size of the bed should be from 21 inches to 26 inches at the base, and the same measurement in height, finishing off span-shape. The sides must be gently beaten with a spade to make them even and solid; afterwards, the bed should be combed with a fork over the surface and on both sides, from top to bottom, so as to draw out any straw which might be too near the surface. Finally, spread over it some litter, which must always be kept dry, and in this condition the bed is left for several days; in summer, watering it from time to time with tepid water.

*Littering down is only necessary for beds placed out of doors or in sheltered positions where light penetrates.* Those made in perfect shade and darkness do not require it.

After a few days the bed will have reached a moderate degree of heat ( $70^{\circ}$  to  $80^{\circ}$ ), which can be ascertained by the insertion of the probe generally used for hotbeds.

The next process is dibbling or planting the spawn. That manufactured in England is made into the form of oblong square cakes or bricks, but that imported from France is in thin layers. The latter is the variety used by the market gardeners around Paris. Both kinds are impregnated with a whitish filament or felt-like substance, consisting of mushroom plant, and possessing the property of reviving after having been kept dry in a granary for several years.

The process of dibbling is performed with the hand, by making little oblique openings about  $2\frac{1}{2}$  inches in diameter, and of the same depth. Into each opening is introduced a piece of spawn.

If English spawn is used, each piece is about the size of a small hen's egg; but if French, a flake of about the same diameter as the opening into which it is inserted is the proper quantity. The manure removed in making the hole is then restored and well pressed down. Mushroom spawn should always be in a dry condition *for conveyance*, to insure its preservation; but so used, it often happens that it takes root too slowly, allowing the bed in the mean time to become cool. To obviate this inconvenience, the spawn should be deposited four or five days before planting in some damp situation (in a cellar, for example), which will make it soft, and facilitate the vegetation; but care must be taken that it does not become mouldy. The openings are made equidistant, nine inches apart; on two lines, the first commencing three inches from the base, and the second five to six inches above the first, the holes on the first line alternating with those on the second in a triangular pattern. This being done, the bed is again littered over, and at the end of a few days it must be examined to ascertain if the spawn has taken root, which will be known by the increase of white filament in the dibbling-hole spreading itself in the bed. If not, the spawn, which has become black, is carefully withdrawn; and, in holes skilfully made by the side of the old ones, a new supply is immediately introduced; unless the bed may have become overheated, in which case it is allowed to repose until it has returned to a suitable temperature, which should not decline below  $75^{\circ}$ , nor rise above  $80^{\circ}$ .

If the spawn has taken well, it is allowed to remain six or eight days, to permit of its penetrating to the top of the hotbed, when the latter is pressed firmly with the hands before earthing it. This operation consists in covering the entire bed with a layer of finely-sifted earth, about one-third of an inch thick, which is properly adjusted by lightly pressing it down with the back of a spade. The litter is then replaced and lightly watered, if the season requires it. The litter should never be taken off in any season, as its presence tends to keep the bed for a longer time in bearing. The most suitable temperature for beds in bearing is  $50^{\circ}$  to  $55^{\circ}$ , and as a high temperature causes the mushrooms to come small, this should be avoided.

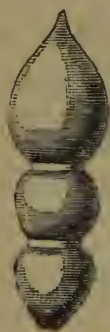
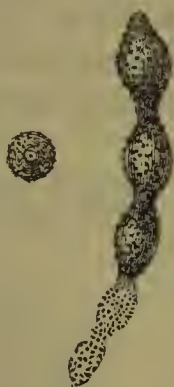
In gathering mushrooms, only a small space should be uncovered at a time. The gathering being finished, a little sifted earth must be placed over the spots from whence the mushrooms were removed, and the litter immediately restored. In dry seasons, after gathering, it is often useful to water moderately under the litter; but in wet seasons it is frequently needful to renew the litter, which may have become too much saturated with rain. The produce from one bed usually lasts from two to three months; but if in a cellar, it might last from four to five months.—By Sutton & Sons, in *The Gardener's Magazine*.



## CHALK FORAMINIFERA.

SINCE the publication of our January number, with its figures of "Recent Foraminifera," we have been favoured with so many letters of commendation for having commenced in such earnest to supply our microscopical readers with figures of Foraminifera, that our resolution was confirmed of continuing them at the earliest opportunity. Unforeseen circumstances having prevented our artist making a series of drawings in continuation of what we termed "Recent Foraminifera" in time for the present issue, we have adopted "Chalk Foraminifera" as its temporary substitute.

It may be known to some of our readers, that, in 1840, the celebrated M. Alcide d'Orbigny published in the *Memoirs of the Geological Society of France*, vol. iv., a very valuable paper, entitled "Mémoire sur les Foraminifères de la Craie Blanche du Bassin de Paris," enumerating, describing, and figuring fifty-four species of Foraminifera. As this Memoir was not published in any other form, it has been suggested to us to reproduce the figures, inasmuch as it is exceedingly difficult for students of these forms to obtain a glimpse of the figures of D'Orbigny. Acting upon this suggestion, we have presented herewith a first instalment. In order that they may lose none of their value as an interpretation of D'Orbigny's views, it is our intention to enumerate them in the same order, and with the same names as they appear in the Memoir already alluded to.

Fig. 75. *Nodosaria limbata*.Fig. 76. *Dentalina aculeata*.Fig. 77. *Dentalina communis*.

1. The first genus illustrated is *Nodosaria*, and its species *Nodosaria limbata* (fig. 75). The locality assigned is Meudon, where it is said to be very rare: in Morris's Catalogue it is enumerated as British, from Charing.

2. *Dentalina* follows, as a sub-genus of *Nodosaria*, with its first species, *Dentalina aculeata* (fig. 76), and it is said to be common at Sens, and more rare at Meudon, and in England. It is included in Morris's list as contained in English chalk, and the upper lias at Ilminster.

3. The next is *Dentalina communis* (fig. 77), found sparingly at Meudon, in the tertiary of Italy, the

crag of Bridlington, coralline crag at Sutton, and living in the Adriatic Sea.

Fig. 78. *Dentalina gracilis*.Fig. 79. *Dentalina nodosa*.

4. *Dentalina gracilis* (fig. 78), from Sens, is also represented in British chalk, in the Gault at Folkestone, and in the chalk of Bohemia. It is referred to and figured by Williamson in the *Transactions of the Manchester Geological Society*.

5. *Dentalina nodosa* (fig. 79) is said to be common at Sens, but uncommon at Meudon and St. Germain. It is doubtfully recorded by Morris, in Britain, from Charing.

Fig. 80. *Dentalina Lorneiana*.Fig. 81. *Dentalina sulcata*.

6. *Dentalina Lorneiana* (fig. 80), from Sens. Occurs also in the chalk of Kent, and in Bohemia, the latter locality being on the authority of Reuss.

Fig. 82. *Dentalina multicostata*.

7. *Dentalina sulcata* (fig. 81) is stated to be very common at Sens, Meudon, St. Germain, in the greensand of the environs of Mans, and in the chalk of England. It is not the *Nodosaria sulcata* of Nilsson, which has occurred at Charing, and in the Gault at Folkestone.

8. *Dentalina multicostata* (fig. 82) is the last in the genus, and the first not named in the list of



British Fossils. It is rare at Sens, St. Germain, and Maestricht.

9. The next genus is *Marginulina*, which has five representatives. *Marginulina trilobata* (fig. 83), is common in the environs of Sens, and very rare at Meudon, St. Germain, and in England.



Fig. 83.  
*Marginulina trilobata*.



Fig. 84.  
*Marginulina compressa*.

10. *Marginulina compressa* (fig. 84), very rare at Meudon, found also in the greensand of Mans, and recorded by Morris, from Charing.

11. *Marginulina elongata* (fig. 85) is common at Sens, rare at Meudon and St. Germain, but is found in the Kentish chalk, and in Bohemia, and other parts of Europe.

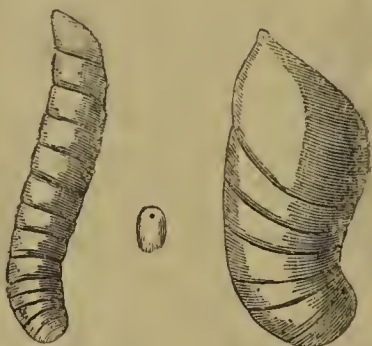


Fig. 85. *Marginulina elongata*.

12. *Marginulina raricosta* (fig. 86) is very rare at Meudon, the only locality given by D'Orbigny, but Morris adds Charing in Great Britain.

13. The fifth and last species is *Marginulina gradata* (fig. 87), found only in the neighbourhood of Sens, and apparently not recorded in Britain.



Fig. 86.  
*Marginulina raricosta*.



Fig. 87.  
*Marginulina gradata*.

The genus *Fronicularia* completes D'Orbigny's order *Stichostegia*, and our first instalment.

14. *Fronicularia radiata* (fig. 88) is said to be rarely met with at Meudon and St. Germain. Not apparently recorded in Britain.

15. *Fronicularia elegans* (fig. 89) is also very rare at Meudon and Sens, and wholly absent from Britain.

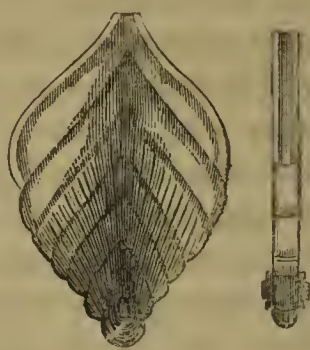


Fig. 88.  
*Fronicularia radiata*.



Fig. 89.  
*Fronicularia elegans*.

16. *Fronicularia Verneuiliana* (fig. 90) is a beautiful species, common at Sens, but rare at St. Germain and Meudon. It is recorded in Britain from Charing, and in the chalk.



Fig. 90.  
*Fronicularia Verneuiliana*.

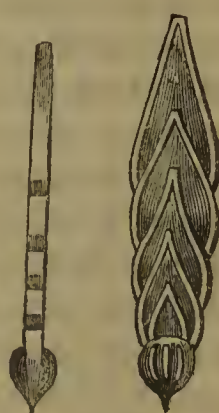


Fig. 91.  
*Fronicularia Archiaciana*.

17. *Fronicularia Archiaciana* (fig. 91), though D'Orbigny says it is always rare at Meudon and Sens, is recorded in Britain from Charing, and in the chalk, and by Williamson in his monograph as found living at Sandwich.

18. *Fronicularia ornata* (fig. 92) is recorded solely from Meudon.

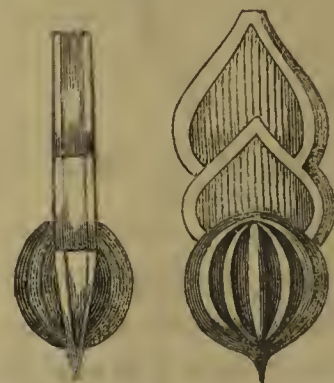


Fig. 92. *Fronicularia ornata*.

19. *Fronicularia tricarinata* (fig. 93), apparently rare in the neighbourhood of Sens, but in Britain at Charing, and in Kentish chalk.

20. The last species is *Fronicularia angulosa* (fig. 94), said to be very rare at Meudon, and not stated in the British list.

If we take a survey of this series of twenty species, according to D'Orbigny, we find that not less than



fourteen are recorded as occurring in Great Britain, or fully two-thirds of the whole, and that the greatest



Fig. 93. *Frondicularia tricarinata*.

falling away of British representatives is in *Frondicularia*, in which genus, out of seven species, only three, or less than half, can be claimed by us. We do not pretend to enter upon the question of specific

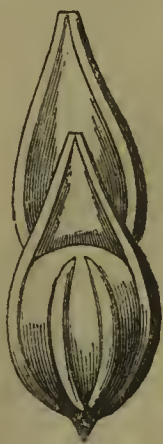


Fig. 94. *Frondicularia angulosa*.

differences, our object at present being merely to act as interpreters of our author, and to place his figures before our readers, in the hope that they may be a further help to such of them as may desire to become better acquainted with Foraminifera.

#### ANOMODON ATTENUATUS.

**A**MONG the mosses are a number of species whose head-quarters appear to be North America, where they are common and bear fruit freely; and some of these are found not unfrequently in Europe, but have not been detected in Britain. That several of them ought to occur here is certain, and every year adds a few to our list.

To my valued correspondent, the Rev. J. Ferguson, I am indebted for a very interesting species of this kind, which he discovered in August, 1868, growing very sparingly on rotten trunks of trees and damp sandstone rocks, in the Den of Airlie, Forfarshire.

*Anomodon attenuatus* (Huebener, 1833); *Hypnum attenuatum* (Schreber, 1771); *Leskea attenuata* (Hedwig, 1787).—Dioicous, matted, procumbent, much branched; branches vague, curved at apex, and also taking the form of very slender, attenuated flagellæ, deep green. Cauline leaves imbricated, becoming reflexed and patulous when moist, sometimes secund; from a narrow clasping base, ovate, lanceolate, acute, thick, and opaque; nerve strong,

pale, vanishing below apex; cells very minute, rounded, finely papillose, paler at base. Perichaetial leaves narrowly acuminate, with the nerve obsolete, and laxer pellucid areolation. Capsule on a largish smooth stalk, erect, cylindric; lid pale, conic, with an oblique beak. Peristome with long narrow whitish teeth.

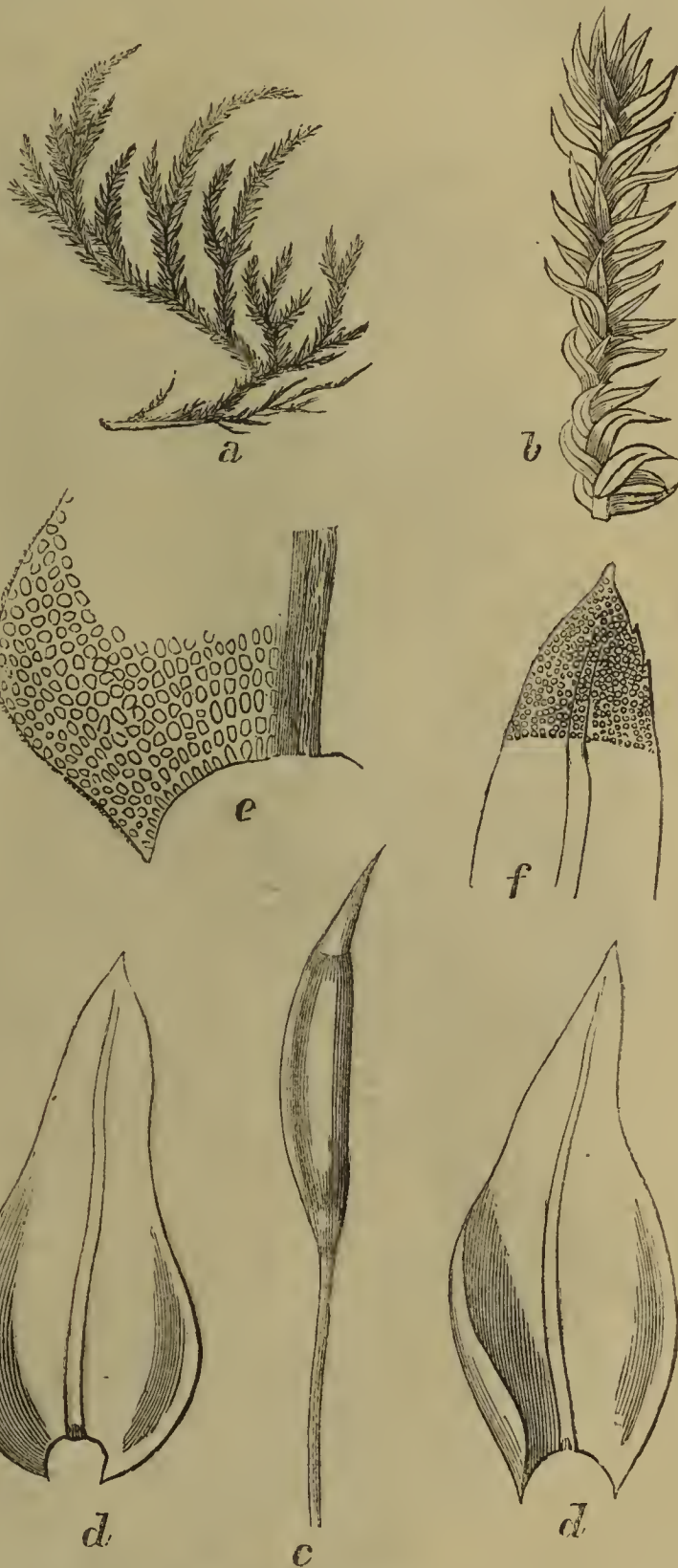


Fig. 95. *Anomodon attenuatus*.

*a*, plant nat. size; *b*, branch magnified; *c*, capsule; *d*, leaves; *e*, *f*, base and apex of a leaf.

The capsule is drawn from American specimens collected by Sullivant, preserved in the herbarium of the late N. B. Ward, Esq.

R. BRAITHWAITE, M.D., F.L.S.

**DIVER IN YORKSHIRE.**—A fine male specimen of the "Black-throated Diver," or Speckled Loon (*Colymbus arcticus*), was shot on the 10th February last, on the Ouse, in the immediate vicinity of this city.—*S. W.*, York.



## A BOOK OF BIRDS.\*

"BUT, besides song," writes Michelet, "the Bird has many other languages. Like man he prattles, recites, converses. He and man are the only beings which have really a language. Man

and flight—these are the faculties in birds which man cannot help but admire; which he constantly strives to imitate. Beautiful birds, they have many enemies, but have they not also many friends? Books about birds always seem welcome to us. Is it because we love birds more than other animals



Fig. 96. GOLDFINCHES AND NEST.

and the bird are the voice of the world." Song

\* "Cassell's Book of Birds," translated from the German of Dr. Brehm, by Thomas Rymer Jones, F.R.S. Parts I. to IV. London: Cassell, Petter, & Galpin. The woodcuts illustrating this notice are kindly lent by the publishers.

or is it because there is something so ethereal, so spirit-like in birds, so akin to a condition for which the nature of man constantly yearns? Children exhibit a love for birds, first of all created things outside their own homes. And the full-grown man,



after a day of toil and care, comes home to rest, and whistles down the bird to share his evening meal. "Man and the bird"—are they not something more than "the *voice* of the world"?

The first four parts before us of a new Book of Birds promises to be a greater favourite than any of the Books of Birds yet presented in an English dress. A popular work, on such a popular theme, could scarce fail to be popular, provided author and

finch. "A friend of ours," says the author, "possessed a bird of this species, which he had reared and trained himself. The cage was hung quite low, so that visitors could approach. When its owner wished it to sing a tune that it had learnt with great exactness, he went to the cage, called his favourite by name, bowed three times, and each time was answered by the bird with great liveliness and joy. After the third salute the little creature



Fig. 97. THE WAVED PARROT (*Melopsittacus undulatus*). |

publisher failed not in their duty to themselves. In the present instance there is already sufficient evidence that both appreciate their work and intend to perform it. Is it not enough that a Book on Birds by Brehm, translated by Professor Rymer Jones, and illustrated by full-page coloured plates and a profusion of woodcuts, should be announced, to insure an extensive sale, and leave us nothing to do but to commend?

We open casually at page 105. It is the Bull-

commenced its exquisite song, singing it perfectly, and then pausing to receive its master's bow of satisfaction, exhibiting at the same time signs of much delight if praised for its efforts. One circumstance in this performance was remarkable: it would respond to and perform, after receiving the necessary salutes from any *man*, but utterly refused to obey the signs or commands of a lady. A female relation of its owner tried to entrap the bird, by putting on its master's hat before approaching



the cage; but this device was useless—the ungallant little songster proved as obstinate as ever.”

Here again is something about the pretty little Waved Parrot (*Melopsittacus undulatus*) so deservedly a favourite as a cage-bird in this country. “A pair of waved parrots in our possession occupied a large cage, in which they seemed very comfortable; but perhaps the bright sun, as it laughed at them through the windows, made them sigh for freedom. One day the female cleverly made her escape, and, before we discovered it, had flown through the window. We now learned to admire this bird, from another point of view, as we watched its glorious flight, and may say with truth that we forgot to feel angry at our loss. The fugitive rose high into the air, and screamed with delight as it wheeled round and round with incomparable rapidity over a neighbouring garden. It flew quite differently to any parrot we ever saw—indeed, more like a falcon or a swallow, and was soon out of sight; but in a few minutes reappeared in the garden, apparently in consequence of the anxious cry of its mate,—for we had at once placed the latter near the window. The lovers of these birds know that their tone is deceptively like that of our sparrows. It was the height of summer, and all the roofs were covered with young sparrows, who exhibited the greatest agitation as soon as the beautiful stranger appeared. The parrot had placed itself upon a plum-tree near the window, and from thence conversed with its mate. The young sparrows, who thought that the enticing chirp was intended for them, ventured near in flocks, regardless of the warnings and cautions of their elders; for, though the latter seemed astonished, they were far too old birds to be deceived, and would not approach. The young ones, on the contrary, surrounded it in crowds. It took not the slightest notice of them, but they were not to be repulsed; they became most pressing in their attentions—hopped quite close to it, looked at it with the greatest delight, and answered its chirp with all their little strength. When it became angry, and flew off to another tree, the whole army followed, and it was only when the stranger began to exhibit its splendid powers of flight that the sparrows were compelled to remain below abashed. This comedy lasted for about half an hour, and the whole length and breadth of the garden was filled with sparrows; when, at last, love for its mate made the fugitive return to its room. On this it was seized and put into the cage, where it was most tenderly received by its companion, and the crowd outside dispersed.”

If birds have any charm for our readers, young or old, but especially the young, we commend them to this book as just the one to suit them. In the course of its progress towards completion we may, perhaps, have something more to say.

## DEATH OF NATIVE BIRDS IN NEW ZEALAND.

IT is not often that our self-expatriated countrymen condescend to furnish us with any fresh facts bearing directly upon the natural history of their adopted homes; but too frequently they leave our shores full of good intentions, and if they do remember our wants at all, their description of the specimens they forward are so vague and unsatisfactory, and so frequently selected without judgment, or are so indifferently preserved, as not to be worth the cost of postage and carriage imposed upon us.

More than once it has been my misfortune to have to pay heavily for cases of bird-skins sent from North America, which upon examination proved utter wrecks, from damp and careless packing; and I have a painful recollection of one box in particular, which I discovered to be so fearfully infested with the common clothes-moth, that I was compelled at once to burn or bury nearly every specimen it contained, including a magnificent white-headed eagle that had been shot floating over Indian Island in the Bay of Passamaquoddy.

These are trials and disappointments which might be easily remedied by a little forethought. We do not desire to put our friends to unnecessary expense or trouble, or yet look for birds from all parts of the world, as Réaumur received them, preserved in spirits of wine. A simple skin, well coated inside with arsenical soap, and folded in a paper bag, is all we ask for.

But it is time I should now pass on to a strange little scrap of bird history which has reached me from New Zealand, and my object now in making it more generally known is to elicit information. It has often been remarked by reliable observers in that colony that the small native birds were gradually but certainly lessening in number, and that many causes are attributed for this decrease. Amongst them, that they have become the prey of wild cats, an animal I understand now a source of trouble and annoyance to the settlers in the interior; but if I am correctly informed, the small birds have a more treacherous and deadly enemy in our industrious old friend the honey bee. This very singular discovery was first made by the natives, and from them we learn that the smaller birds which dwell principally in the wooded districts of New Zealand, are in the habit of collecting their food, or a large portion of it, by dipping their tongues into the nectaries of blossoming trees. Since bees have been introduced by our colonists, and this I believe is of quite recent date, the birds have sought the same blossoms, and while being concealed in the flowers the bees have stung their tongues, which has caused their death.



Pope asks us:—

“Who taught the natives of the field and wood  
To spurn their poison and to choose their food:  
Prescient, the tides or tempest to withstand,  
Build on the wave, or arch beneath the sand?”

And though we are all prepared to answer his question, still there appears in this case something *wrong*, if I dare use the expression, or something defective in what has been called the “unerring providence of instinct.” Here a little insect has been introduced into a new habitat and has disarranged the balance of nature. I am disposed to think that the “little birds” alluded to have sought, as was their custom, the tree blossoms more perhaps for the insects attracted thither than for the supposed honey stores they contained, as comparatively few birds are purely nectar-sippers, or that possess tongues which can work like the sucker of a pump in a tubular bill, as is the case with the humming-bird, the honey-eater of New Holland (*Meliphaga Novæ Hollandiæ*), and the wattled honey-eater of Australia (*Anthochaera corunculata*), &c. Even in the gem-like *Trochilidæ* insect food has been detected in their stomachs, proving to us that their nourishment is drawn from both sources. Could we only ascertain the fact, I think it would be found that the introduced bee bears some strikingly deceptive resemblance to one or more of the stingless diptera peculiar to New Zealand, and that the insectivorous and honey-sipping birds, ignorant of its character, have preyed upon it as food. A knowledge of the bees imported might assist in throwing some light upon this singular subject. In England we have, I believe, in a state of semi-domestication, three varieties of this valuable little insect; viz., *Apis fasciata*, or the Egyptian bee; *Apis ligustica*, the Italian bee, and *Apis mellifica*, or the common honey bee. Probably one or other of these bees is now carrying on the death-war with the New Zealand birds.

In conclusion, I may observe that it is with touching suggestiveness the aborigines compare these doomed little birds to themselves, and say that their own gradual decrease is caused in the same way. Unconscious of the many dangers introduced into their once happy land by civilization, they run into them as unsuspectingly as the little birds fly to their gorgeous flowers for the sweetjuices contained in their nectaries, and are suddenly destroyed or die, which is but too frequently the case with those who have learned from the white man the life-destroying habit of drinking ardent spirits, a sad and a lingering death.

HENRY MOSES, M.D.

Bainton House, Reading.

MUSICAL FISHES.—We hope to give some further information on this subject in our next issue.

## THE ANT-LION.

(*Myrmeleon formicarius*.)

ONE of the most curious and interesting of the many objects which were exhibited at the *soirée* of the Quekett Microscopical Club, on the 11th of March, was the larva of the Ant-lion shown by Mr. Edmund Wheeler, of Holloway. During our school-boy days we had read about the Ant-lion, and how it caught its prey, and why it deserved its name, but until now had never gazed upon its form. That very interesting volume “Homes without Hands” has of course something to say about this creature, and from this source we will proceed to lay its history before our readers. “In its mature state it presents nothing worthy of remark, except, perhaps, the elegance of its form and the delicacy of its wide gauzy wings, which much resemble those of the common Dragon-fly. But in its larval condition it is truly a wonderful being.



Fig. 98. Larva of Ant-lion magnified.

“Though predaceous, and feeding chiefly on the most active insects, it is itself slow, and totally unable to chase them; and were it not furnished with some quality which serves it in the lieu of speed, it would soon die of hunger. The very look of the larva is enough to make the observer marvel as to its method of obtaining food. Thick, short, soft, and fleshy, the body is supported on six very feeble legs, of which the hinder pair only are employed for locomotion, and these can only drag it slowly backwards. Indeed, the general outline of the body and



head bears no small resemblance to that of a fat-bodied garden spider. So feeble are its limbs, that they are practically of very little use in locomotion, and even when they are cut off, the creature can move nearly as well as when they were in their places. From the front of the head project a pair of long, slender, curved mandibles, which give the first intimation that the grub has anything formidable in its nature. These mandibles are curiously made, being deeply grooved throughout their length, and permitting the maxillæ, or inner pair of jaws, to play up and down them.

"Inert and helpless as it may seem, this grub is a ruthless destroyer of the more active insects, and, moreover, seldom catches any but the most active. Choosing some sandy spot, where the soil is as far as possible free from stones, it begins to form the celebrated pitfalls by which it is enabled to entrap ants and other insects. Depressing the end of its abdomen, and crawling backwards in a circular direction, it traces a shallow trench, the circle varying from one to three inches in diameter. It then makes another round, starting just within the first circle, and so it proceeds, continually scooping up the sand with its head, and jerking it outside the limits of its trench. By continuing this process, and always tracing smaller and smaller circles, the grub at last completes a conical pit, and then buries itself in the sand, holding the mandibles widely extended.

"Should an insect—an ant, for example—happen to pass near the pitfall, it will be sure to go and look into the cavity, partly out of the insatiable curiosity which distinguishes ants, cats, monkeys, and children, and partly out of a desire to obtain food. No sooner has the ant approached the margin of the pitfall, than the treacherous soil gives way, the poor insect goes tumbling and rolling down the yielding sides of the pit, and falls into the extended jaws that are waiting for it at the bottom. A smart bite kills the ant, the juices are extracted, and the empty carcase is jerked out of the pit, and the Ant-lion settles itself in readiness for another victim.

"Sometimes, when a more powerful insect, such as a large wood-ant or beetle, or perhaps a hunting spider, happens to fall into the pit, the Ant-lion does not obtain a meal on such easy terms. The victim has no idea of surrendering at discretion, but tries to scramble up the sides of the pit, and in its furious exertions it brings down the sand in torrents, filling up the pit, making the slope of the sides shallower, and so rendering its escape easy. Then there is a battle between the Ant-lion and its intended prey, the one bringing the sand into the pit and the other flinging it out again so as to restore the steepness of the sides, and to deepen the pit.

"Sometimes a quantity of the sand flung by the Ant-lion happens to fall on the escaping victim, knocks it over, and enables the devourer to grasp it

in the terrible jaws, which never open but to reject the dead and withered carcases; sometimes the insect is tired before the Ant-lion, and suffers itself to be captured; and sometimes, though very rarely, it succeeds in making its escape. In either case the pitfall is quite out of shape, and instead of rearranging it, the Ant-lion deserts it and makes another. Some writers have said that the Ant-lion flings the sand at its escaping prey with deliberate aim and intention. It does nothing of the kind, but only tosses the sand out as fast as its head can work, without aiming in any direction, or having any idea except to prevent the pit from being filled up.

"Its earth-burrowing life does not cease until it assumes the perfect state. When it has passed its full time in the larval condition, and is about to change into a pupa, it spins a silken cocoon of a globular form, and therein remains until it is about to assume its perfect condition. The pupa then bites a hole through the side of the cocoon, and projects its body half out of the aperture. The pupal skin then withers, bursts, and the perfect insect emerges. Scarcely has it taken the first few breaths of air, than its abdomen, which before was short, so as to be included within the cocoon, extends to nearly three times its original length, so as to resemble that of the Dragon-fly; the curious antennæ unroll themselves, the wings shake out by degrees their beautiful folds, and in a short time the lovely insect is ready for flight. It is scarcely possible to imagine a more complete contrast than that which is exhibited by the larva and the perfect insect, and if the two were placed side by side, no one who was not aware of the circumstances would think that they are but two stages of the same insect."

#### FLORAL FINDINGS.

MY remarks will scarcely bear the construction that Mrs. Watney seems to put on them. I did not say that Elm timber was without utility, but that it had no special excellence over other woods, unless in withstanding the action of water. I shall not dispute that it may be made to assume a mahogany colour by treatment with "some particular acid"—many other woods can be made to do the same.

I have no doubt brown paper may be made from its bark; as I know it may be from a great variety of substances—wood for instance.

Before Mrs. Watney mentioned it, I had not heard of elm-bark being a dye-stuff; and, having no special knowledge of this branch of the arts, I have inquired about it from a friend, who is engaged in the preparation of dyes, and is well informed on the subject. He tells me:—"The bark has, I believe, been tried to dye a kind of brownish colour; but it is not used at all now." For information on



the medicinal properties of plants, I generally turn to the most recent good authority on my shelves, which happens at present to be Pereira's "Materia Medica," edited by Dr. Farre (1865). Here I find of elm-bark that "it has now almost fallen into disuse," and that "although it has been retained in the Pharmacopœia, no preparation of it has been given." There must be some good reason for this, as all its virtues—excepting its faculty of curing broken bones—were set forth by Pliny (Nat. Hist., book xxiv. c. 33), and have been reproduced by botanists in general, up to the eighteenth century.

I beg Mrs. Watney's pardon for making her call elm-bark highly nutritious, instead of highly astringent (which I have no doubt she would attribute to the actual cause—a slip of the pen), and to assure her that I have no intention of "shooting hard words," at her. At the same time I do not like to see overmuch of "imagination" imported into natural-history matters; nor without concern can I watch a "fanciful person" riding her "Pegasus" so as to endanger both herself and others. In such a case, I could wish her on a safer steed, singing cheerily—

"Hi ho dobbin, gee ho dobbin,  
Hi ho dobbin, gee up, and gee ho."

I am obliged to Mrs. Watney for her explanation why people fancy the Sackbut and the Sambuca identical. As to why they should not be so considered, it might be discourteous to reply that my answer is to be found in what I have already said on the subject; still it would be unreasonable to ask you for space to go at length into what is but a very dry and profitless subject. To be brief.

#### *What is a Sackbut?*

I quote the following answers:—

1. An instrument of wind music.—*Bailey's Dictionary*.

2. A kind of pipe.—*Johnson's Dictionary*.

3. A kind of trumpet.—*Walker's Dictionary*.

4. A trombone.—*Encyclopædia Britannica*.

6. Die Posaune.—*Hilpert's Eng. Ger. Dictionary*.

Johnson, in addition to the Spanish name pointed out by "G. H. H.," gives Fr. *Sambuque*; but I do not find this word in French dictionaries. Levizac gives Saquebute.

#### *What is a Sambuca?*

I quote the following answers:—

1. *Σαμβύκη*, a triangular instrument with four strings.

II. An engine of like form used in sieges.

*Liddell and Scott's Gr.-Eng. Lexicon*.

2. *Σαμβύκη*, Ein dreieckiges Saiteninstrument.

II. Eine Art von Belagerungsmaschine.

*Ros's Griechisch-Deutsches Schul-Wörterbuch*.

3. Sambuca, a triangular stringed instrument.

II. A machine of like form to a Sambuca, used by besiegers; a sort of bridge for storming walls. *White and Riddle's Lat.-Eng. Dictionary*.

4. Sambuca, a harp, of oriental origin. Also the name of a military engine used to scale the walls and towers of besieged cities. It was called by this name on account of its general resemblance to the form of a harp.

*Smith's Dictionary of Antiquities*.

The illustration of the musical instrument in Smith's dictionary represents the celebrated Theban harp, a picture of which may also be found in Knight's "Pictorial Bible," Ps. cviii. There is another picture of it in Burney's "History of Music," vol. i.

I do not deny that the name Sackbut has ever been applied to a stringed instrument. Such an application may be found among the illustrations of Whiston's Josephus (Blackie & Sons). The same application of the name Sackbut occurs in a note in Knight's "Pictorial Bible" (Dan. iii.), but in this way:—"The word in the original is *sabca*; whence evidently the Greek *σαμβύκη*," which is then described as a triangular stringed instrument. If Mrs. Watney doubts the propriety of calling *sabca* a sackbut, that is another matter, and has nothing to do with the question whether the Sackbut and the Sambuca are identical. I cannot express an opinion as to the correct interpretation of the Hebrew Scriptures, as I do not understand the Hebrew language.

In Eadie's "Dictionary of the Bible," the Sackbut is described both as a stringed instrument and a trombone. In Good and Gregory's "Pantologia" such confusion is alluded to, but the Sackbut is unhesitatingly set down as a trombone.

Altogether, the general opinion seems to be that the Sackbut is a wind, and the Sambuca a stringed, instrument; and Mrs. Watney's argument does not convince me that this opinion is wrong.

R. H. A.

[WE hope that our correspondents will now come to the conclusion that we have had enough of this subject, and henceforth forbear to play on "Sackbut" or "Sambuca." Only one person has the privilege of a last word. It could not be denied to a lady.—ED. S.-G.]

## ZOOLOGY.

ROBIN AT EASE.—During the month of February, a Robin visited the house of a friend of mine every meal-time, and would go into the house and sit upon the table. If the door was not open, it would sit and sing till it gained admission. At night it would stop and roost in a holly-bush that hung up in the centre of the kitchen. It came every night to roost for a fortnight; once or twice it tried to take its mate, but it would not go. It never goes, now the snow has gone and the bush is pulled down.—C. A. C.



**SNOW BUNTING.**—Mr. Mash wishes to know if this bird was common anywhere besides the Felixstowe Marshes this winter. I have shot seven during the past season near Surf, about seven miles from this place. There were still a good many left when I was there last, about three weeks since.—*Walter Cole, Exeter.*

**SWALLOWS.**—When out for a walk this day, March 2nd, I saw two swallows flying up and down the Exe. Is not this very early for these birds?—*Walter Cole, Exeter.*

**A RAT'S RIDE.**—During the great flood of the 4th of September, 1829, when the river Tyne was at its height, a number of people were assembled on its margin. A swan appeared with a black spot on its plumage, which on its nearer approach proved to be a live rat. It is probable that the latter had been borne into the water by some object, and observing the swan, had taken refuge on its back for safety. As soon as the swan reached the land the rat jumped off and ran away.—*M. J. Teil.*

**THE "AMERICAN ENTOMOLOGIST"** for February contains 32 full pages of more than usually interesting reading matter, and is embellished with no less than 31 beautiful and well-executed woodcuts. The leading article treats of the large *Cecropia* Moth, and describes several of its parasites. This is followed by one on "Galls and their Architects," in which an account is given of certain galls made by beetles on both the raspberry and grape. Then comes an entomological report, and a paper on Imported and Native American Insects, both of which abound in the most important practical suggestions. There are also articles on "Bladder-plums," "the Trumpet Grape-gall," "the Itch-Mite," "a New Bean Weevil," "the Plum Curculio will deposit in Fruit which overhangs Water," "the Goat-weed Butterfly," "Insects Injurious to the Grape Vine," "Southern Notes," "the Grain Bruchus of Europe just imported," "Locust Borers," "Answers to Correspondents," and "Jottings."

**MODIOLA BARBATA.**—Being at my fishmonger's in this place yesterday, and while inspecting some fine scallop shells exposed for sale, I found attached to one of them two shells which, being new to me, I begged of him. On reference to Forbes and Handley's work on the Mollusca, I find them to be *Modiola barbata*, a species mentioned in the work as follows:—"On the English coast individual specimens are much prized. Torbay, Exmouth, Portland, Weymouth, &c., are mentioned as localities." I thought conchologists might be interested in knowing it has been taken on this coast, as, on inquiry, I was told the scallops were dredged up about ten miles out at sea from this town.—*W. Hambrough, Worthing.*

**GANGETIC PORPOISE.**—The observation of the natives, in reference to this creature (S.-G. 70), that it was "of course viviparous, as it had no visible ears," though by no means a rigidly correct inference, is not bad as a rough generalization, and shows appreciation of the connection between structure and habit. External ears seem to be the prerogative of the mammalia, which, *as a class*, are alone viviparous, and are so without exception, but some of its members are destitute of these organs—notably the Cetacea, to which the porpoises, whales, &c., belong. Nevertheless this section is as viviparous as any of the others, suckles its young, and corresponds in anatomical structure and function with other mammals, though from their peculiarity of form and marine habits, the Cetacea are popularly regarded as fishes, no doubt in India as elsewhere. Our British Mole may be cited as a familiar case of a mammal without outward ears. The other classes of Vertebrates may be regarded as oviparous, the birds always, the fishes nearly so, and in the viviparous reptiles the exception is rather apparent than real, as the covering of the egg is rent at the time of deposition, whence they are usually termed ovo-viviparous.—*G. Guyon, Ventnor, March 14th.*

**LARVA OF PRIVET HAWK-MOTH.**—Your correspondent "M. B. M." (page 70, March) seems to have made rather a remarkable discovery. The caterpillar of the Privet Hawk-moth (*Sphinx ligustri*) is well known to feed up in August or September, and I believe invariably to pass the winter in the chrysalis state. It feeds only on privet, lilac, and occasionally holly, laurustinus, and one or two allied plants. The discovery, therefore, of a specimen of the larva in January feeding on scarlet geranium (pelargonium I suppose) is, to say the least of it, unusual. The only bright-green caterpillar which I can call to mind as likely to do mischief among greenhouse plants in the middle of winter is that of the polyphagous and very abundant Angle Shades-moth (*Phlogophora medicalosa*), but it could hardly be mistaken even when young for that of the Privet Hawk-moth.—*B.*

**EMIGRATION OF OTTERS.**—Last year in Scotland, a labourer going to his work, soon after five o'clock in the morning, saw a number of animals coming towards him, and stood quietly by the hedge till they came alongside of him. He then perceived four old otters, probably dams, and about twenty young ones. He took a stick out of the hedge and killed one. Directly it began to squeak, all the four old ones turned back and stood till the other young ones had escaped through the hole in the hedge, and then went quietly themselves. Several families were thus journeying together, and probably they had left their former abode, not finding a sufficiency of food.—*M. J. T.*



## BOTANY.

PODDER.—“A weed called *Podder*, winding about Hempe or other like.”—Hollyband’s “Dictionarie,” 1593, quoted by Halliwell. Is this a misprint for Dodder? If so, I should suppose *Polygonum Convolvulus* would be intended, which is known by that name in Cheshire. Can any one refer me to any other list in which *Podder* occurs?—*James Britten*.

FOXGLOVE (pp. 6, 43, 64).—Fuchs published his “*Historia Plantarum*” in 1542, and Foxglove is given as the common English name for *Digitalis purpurea* by Turner (1566), Gerarde (1597), Parkinson (1640), and all subsequent writers. It is not probable that a name like Fuchs-glove, composed as it is of two languages, would ever have come into use; although there are occasional instances of such compound titles: and it is still less likely that a name, commemorative of a foreign botanist, whose works could never have been popular in England, would have become so general in little more than twenty years, as to have become corrupted or translated into Foxglove. Bosworth (*Anglo-Saxon Dictionary*) gives *Foxes-glofa*. Dr. Prior says, “It seems most probable that the name was in the first place *Foxes-glew*, or music—A.-S., *gliew*, in reference to the favourite instrument of an earlier time, a ring of bells hung on an arched support,—the tintinnabulum, and thus answering to the Norwegian *Revbielde*,—fox-bell”: but this leaves the meaning of “fox” still unexplained. I am informed that the plant is still, in Sussex, called Finger-root (Fingerhut?).—*James Britten*.

PYROLA MEDIA.—Is this plant still to be found at Stockghyll, Ambleside? In reply to “R. T., M.A.,” in last month’s correspondence, I beg to state that it is; and every year, too,—though somewhat sparingly. In September, however, it would be well-nigh useless to look for it, unless the season were a very late one. On the 24th of June, 1869, after a long search, I obtained five specimens, in bloom even then; the greater number of them from almost inaccessible clefts in the fork of the higher fall, where alone it is worth while searching for them. Three weeks later a botanical friend and myself again went over the ground on both sides of the fall, but without finding a single plant. On the occasion of my June visit, an old guide who watched my search with a smile of pity that was very amusing, on my return to him, successful, informed me I was “very fortunate,—so many came on the same errand, only to go away disappointed.”—*F. Arnold Lees, Meanwood, Leeds*.

WOLFFIA ARRHIZA.—In SCIENCE-GOSSIP for June and July, 1869, the Rev. W. W. Spicer and Mr. James Britten record new stations in Surrey

and Middlesex for this interesting Lemnaceous plant,—our smallest Phanerogam. Prof. Gulliver has found it abundantly in the East Kent district, and given engravings with descriptions of its intimate structure, as compared with that of *Lemna*, or true Duckweed, in Seemann’s *Journal of Botany* for January, 1869. The chief point which he shows is, that while *Lemna* abounds in raphides, *Wolffia* is destitute of them. This curious diminutive plant is admirably fitted for the fresh-water aquarium, and indeed a delightful and novel addition for cultivation in small vases, such as tumblers and finger-glasses. *Wolffia* has never been seen in flower in this country, but increases in a very curious manner by lateral bulbils, which form a very pretty microscopic object, well observed under a good achromatic objective of an inch focal length.—*Q. F.*

VERONICA BAUXBAUMII.—On reading some recent numbers of SCIENCE-GOSSIP, unavoidably neglected at the time of issue, I find a few notices of the occurrence of *Veronica Bauxbaumii*. Permit me to add to these, that in 1868 and 1869, I several times found this species in the neighbourhood of Oswestry, Salop, in lanes and cornfields. I also met with it near Upton-Magna, Shrewsbury, in 1867; at Borth, near Aberystwith, in 1864; and in a field not far from the racecourse, Leicester, in 1853 or 1854. In the last-named instance I recollect being unable to identify the species, as I was then but a young boy, using Galpine’s “*Flora*,” with scarcely any preliminary knowledge. On afterwards meeting with the plant at Borth and elsewhere, I recognized it as the same which had puzzled me so many years before at Leicester. I think this is one of many wild flowers which spread through their seeds becoming mixed with the seed-corn. I may note the occurrence of *Myosurus minimus* upon the racecourse at Leicester; though this also was not named for many years afterwards, it having likewise puzzled me in my early collecting days, though its appearance and characteristics remained vividly in memory. I have not seen it since 1854 in any locality, and suppose it to be uncommon.—*W., Tunbridge Wells*.

VIBURNUM OPULUS AND THE SPECTROSCOPE.—I have several times read the statement that the spectra produced by the juices of coloured fruits show no well-defined absorption-bands. This is generally true; but I find the berries of the Cranberry-tree (*Viburnum Opulus*) an exception to the rule. The juice of this berry gives a spectrum of one broad, well-defined band in the green—a beautiful spectrum. In Canada we have this tree growing plentifully in a wild state, and in our gardens the Guelder Rose, which is the same tree, cultivated, and with all the flowers neutral.—*D. K. Winder, Toronto, Canada*.



## MICROSCOPY.

RAPHIDES AND SPHÆRAPHIDES.—“G. W.,” in *SCIENCE-GOSSIP*, Dec., 1869, p. 281, states that the Prickly Pear “contains in its pulp a multitude of beautiful raphides. Hence it would seem that the old mistake of calling all microscopic plant-crystals “raphides” still requires correction, notwithstanding Prof. Gulliver’s very clear description in his valuable memoir on the subject in that excellent journal the *Popular Science Review*, vol. iv., and in his subsequent papers in the *Quarterly Journal of Microscopic Science*, and in Dr. Secmann’s *Journal of Botany*. He expressly states that the *Cactus Opuntia*, the Prickly Pear—abounds in sphæraphides, but is quite destitute of raphides. As everything relating

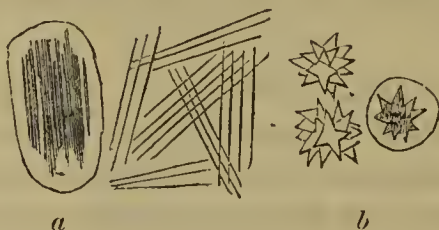


Fig. 99.

a Bundle of Raphides in a cell, with others free.  
b Sphæraphides—one in a cell, and two free.

to the cell-biography of plants is important, and this branch of it especially adapted for microscopic work anywhere, by every person with an ordinary instrument, and who may read the papers above cited, I send you two little sketches as examples of both raphides and sphæraphides, numberless true specimens of which are everywhere to be found, both in town and country. Fig. a shows Raphides in the common Willow-herb (*Epilobium*); and fig. b, Sphæraphides in one of the still more common weeds known under the name of Goosefoot (*Chenopodium*): the figures are magnified about 75 diameters. Prof. Gulliver shows that raphides are of great importance in systematic botany, and that nothing can be more easy and instructive than the examination of both raphides and sphæraphides.—*Q. F.*

MOUNTING INSECT EGGS.—Will you, or any of your readers, kindly inform me of the best method of preparing and mounting the eggs of butterflies and moths for the microscope?—*J. P. K.*

[The chief difficulty is to kill the eggs without doing them any injury. Carbolic acid and benzole have both been tried, but, as stated, without good results. We shall be glad of any practical hints on the subject from our correspondents, as the time for experiments is just coming on.]

CRYSTALS FOR POLARISCOPE.—We have received from Mr. J. B. Dancer, of Manchester, a series of slides of crystals, excellently prepared, and some of them novel. They consist of benzoic acid, palmitic acid, stearic acid, suberic acid, phthalic acid, margaric acid, azelaic acid, fatty acids from human fat,

hematoxylin, binitrobenzol, diazoamidotoluol (by the bye, such a name ought to be worth something), and dinitrophenylic alcohol. This is an excellent series of “objects for the polariscope,” each with a full description, not only how to view the object, but also what it is, and how it is obtained. The series, therefore, is not only beautiful but educational, and deserves to be widely known.

SCALE OF CHUB (fig. 100).—In continuation of our series of illustrations of the scales of freshwater fishes we give that of the Chub (*Cyprinus cephalus*). We have nothing in particular to write about it,

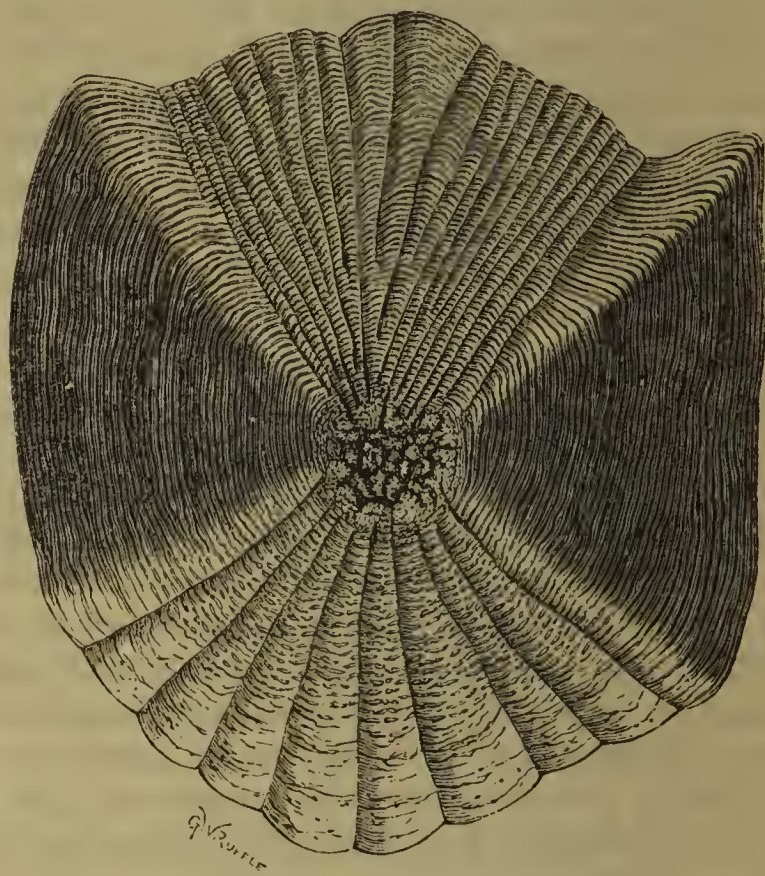


Fig. 100. Scale of Chub.

except to commend it to our readers, as one of our artist’s happiest efforts to render this series worthy of their approval.

SOIRÉE OF QUEKETT CLUB.—The *soirée* of the Quekett Microscopical Club was held (by permission) at University College, on Friday Evening, March 11th, and was as great a success as any of its predecessors. Not being so crowded as last year, on account of a reduction in the number of tickets granted to each member, it was far more comfortable, and the arrangements gave greater satisfaction. A large number of microscopes were arranged in the library and museum by members of the Club, who vied with each other in the exhibition of attractive objects. All the principal opticians were also exhibitors. Messrs. Powell & Lealand showed their immersion  $\frac{1}{16}$ th, and Mr. Crouch his immersion  $\frac{1}{8}$ th. A large collection of beautiful photographs from the India Museum was kindly lent by Dr. Forbes Watson, and others by the late President, Mr. A. Durham, Mr. Frank Good, and Mr. A. Henderson. Altogether the evening was a very pleasant one, and will long be remembered by those who were fortunate enough to be present.



## NOTES AND QUERIES.

DERIVATION OF FOXGLOVE (54).—Many thanks to Mrs. Watney for her new derivation of "Foxglove." It is a decidedly good idea, and though I scarcely think it is the right one, we shall certainly have to include it amongst possible derivations in our "English Plant-Names." I hardly think that the name of a German botanist, whose scientific works were written in Latin, would have been adopted as an English *vernacular* plant-name between two and three hundred years ago. Besides, Mrs. Watney says that the name *digitalis* was suggested to Fuchs by the German name of the plant, "Fingerhut." Just so; then "Fingerhut" was the name for it before Fuchs's time. "Fingerhut" means "a thimble," and this brings us again very near to "Witches' Thimble," a name that connects it at once, if not with the fairies, at any rate with supernatural beings. I have a good friend who is wading through a very old edition of Fuchs for me, in which are marginal references written in cramped English characters by some botanist a couple of hundred years ago, to see if any light may be thrown on the meanings of old names. Possibly he may find something in connection with this very name. In the meanwhile we are much obliged to all correspondents who suggest a new and probable explanation of old and obscure names.—*Robert Holland.*

WOODRUFF (pp. 69, 70).—There is another argument in favour of the name of this plant being derived from "Wood-reeve," namely its similarity to "Hariffe," or "Heriffe," a very common local name of *Galium aparine*, a plant not only allied to the Woodruff botanically, but having its leaves arranged in the same fashion. "Heriffe" is supposed to be derived from A.-S. "haga," a hedge, and "reafa," a tax-gatherer. This last word is, no doubt, connected with "gerefa"; and "hag-gerefa" would, I suppose, mean "master of the hedge." This is an excellent description of the Goose-grass, which, by means of its hooks, climbs over and through the hedge till it overtops it.—*Robert Holland.*

HODDY-DODDY.—In last month's Gossip (March), page 70, doubts are expressed as to the original meaning of these words. It may not be generally known that the precise words, hodman-dod, by which the illustrious Bacon designated shell-snails, were used in Essex, and probably in Suffolk, and may be to this day for aught I know to the contrary; in fact I, as a native of the former county, never knew a shell-snail by any other name than hodman-dod. And well do I remember, on first coming to London (now fifty years since), the amusement, not to say amazement, I caused by calling the shell-snails hodman-dods.—*Joseph Holland, 8, Cobourg Street, Euston Square.*

[In Norfolk, snails are called "dodmans," which is clearly a corruption of the above.—*Ed. S.-G.*]

PRICKMADAM (p. 70).—This name is a corruption of the French *Trique-madame*. Dr. Prior includes under this name *Sedum acre*, *S. album*, and *S. reflexum*; and says, "for *triacque à madame*, an anthelmintic medicine, among the principal ingredients of which were stonecrops." It seems, however, more especially to be applied to *S. album* in most modern French works, that species being called *Trique-madame*, and the yellow-flowered species *Trique madame jaune*. "Prickmadam" does not appear in Turner; but Gerarde applies it to

*S. album*, *S. reflexum*, and others of similar habit, and says, "of the Frenchmen, *Trique-madame*; of the English, Prickmadam." M. le Héricher, in his "Essai sur la Flore populaire de Normandie," speaks of *S. reflexum* as *Tripe-madame*, or *Trique-madame*; and says that *S. album* is called, "dans le milieu de la France, *Trique-madame*, nom aphrodisiaque." These *Sedums* are the only plants, so far as I know, to which the name is given; but I do not remember that any one of them "floureth thrise every yeare."—*James Britten.*

WOODRUFF (p. 69).—The large amount of correspondence elicited upon this subject evinces a widespread interest that emboldens me to trouble you further, because I feel sure that anything which tends to the final settlement of a doubtful case will certainly prove acceptable. A full comparison of different authorities shows that the different forms of Woodrow and Woodruff may both be mutually convertible, thus giving one meaning to both words, which must then necessarily be the correct meaning. It works thus: *Wood-sweet* is defined as *Asperula odorata*, and *Asperula odorata* is further defined as "Woodrow, or Woodruff"; but the origin of both words is alike in Anglo-Saxon; viz., *wudn-rofe*; so that any divergence of meaning must have arisen since the old Anglo-Saxon first became consolidated into English. It appears to me that the terminal "rofe" may be a mutation of *row*, quoted by Dr. Bosworth, p. 188, as "sweet"; *row* and *ruff* would thus appear as equivalents for the Latin *odorata*. Other names, however applicable to the structure of this plant, do not suit the etymology; the Anglo-Saxon *rof*, "famous, brave," is not exact, but suggests a parallel with the German "meister." I think it must fail, because "reeve" would be the right word; "rowel" will not suit, for it is not Anglo-Saxon, but a comparatively modern introduction from the Norman-French *rouelle*, a "little wheel." *Ruff*, again, as an article of dress, is of too modern date for an Anglo-Saxon word; finally, "rough," as equivalent to *asper*, does not suit, for the Anglo-Saxon word for "rough" is *rih*. Let us cling to *wood-sweet* as the original name.—*A. H. Gent.*

DOBBIN AND PEGASUS (p. 54).—I always pity that poor beast Pegasus when I see him far away from his favourite haunts, and the spirited creature must not only be gallant in the highest degree, but also ill in body and mind to put up with the partial attachment he sometimes receives. As for Dobbin, he declares that he would rather not be troubled any more by one who publicly disowns him, and he adds that when realities and fancies are thrown together merely for effect, few can tell which is which. Further, Dobbin wishes it to be understood that he does not interfere with individuals, but only with the statements they make; and, though never intentionally discourteous to either sex, is ever mindful of the purpose for which he peruses his favourite journal. The information Mrs. Watney gives about grafting can hardly be the result of her own experience, and though not in itself incorrect, it is nevertheless misleading, inasmuch as it is almost apart from the real question. Indeed, Mr. Holland's words have been a good deal perverted. He meant that it is more difficult to increase plants by grafting than by seeds, and that such a process, being comparatively troublesome, is never resorted to when the provision Nature makes for reproducing a species is to be had in plenty. Surely the fertile "imagination" of Mrs. Watney cannot lead her so



far afield that she supposes that any station in life can give support to a most childish idea, that of flowers suffering pain when cut. Much verbal importance, however, seems to have been attached to social position, and I therefore take the liberty of stating that the Emperor of China, the Grand Turk of Constantinople, and other potentates, doubtless think it no sin to act contrary to the views of the noble personages mentioned by Mrs. Watney: yes, and even the author of "Floral Findings" cannot always keep from picking the "bright, beautiful things," as the events which took place beneath the elm, whose leaf and fruit were "perfection," will testify.—*James Britten.*

VELVERD.—Can you tell me *what bird* it is to which the Wiltshire folk give the name of *Velverd*? In the same locality they call a Woodpecker a *Yobbingale*.—*R. H. Nisbett Browne.*

SPIDERS AND LARVÆ.—I should be greatly obliged if any reader of SCIENCE-GOSSIP can inform me if spiders prey on larvæ of insects. I think I have on one or two occasions seen caterpillars entangled in their nets; but I have never seen the spiders actually feeding on them.—*George Roberts.*

THE RIB OF THE DUN COW.—In the British audits for 1497, is an item that seems to indicate the origin of the assumed rib (in St. Mary Redcliff Church) of the legendary animal. "1497. Item pd. for settinge upp ye bone of ye bigge fyshe and [illegible] hys worke brote over seas—vj. For two ryngs of jren iiijd." John Sebastian Cabot, on his return to Bristol in 1497, after his discovery of Newfoundland, presented the corporation with a bone of the whale as a trophy of his enterprise, which, they not knowing what to do with, having no "philosophical institution" wherein to place the wonder, had it set up in Redcliff Church. Superficial observation, haste, and carelessness, often promulgate errors, further disseminated by the press. Here is one that has the merit of being as veracious as the legend of the "rib of the dun cow." Richard Twiss, writer of "A Tour in Ireland, 1775," says: "In Bristol I was entertained with the sight of a rib of the famous dun cow, 'killed by Sir William Penn.' The knight and his 'rib' are both deposited in the Church of St. Mary, Redcliff." Its rechristening by the sexton would render it more attractive and increase his fees.—*G. Tovey.*

FOXGLOVE (p. 6).—Parkinson, the herbalist, in his "Paradisi in Sole Paradisus terrestris; or, a Garden of all sorts of pleasant Flowers which our English Ayre will permit to be noursed up," &c., says (p. 383), "We call them generally in English Foxglove; but some (as thinking it to be too foolish a name) do call them Finger-flowers, because they are like unto the fingers of a glove, the ends cut off" (edition 1656); and in his "Theatrum Botanicum" (p. 653), "Digitalis, from the hollow forme of the flowers, which are like finger-stalles" (edition 1690). With reference to "W.W.S.'s" remarks (p. 69), Fairholt ("Costume in England," p. 509) says, "the earliest form of glove represents that article without separate fingers. In the 14th century they were commonly worn with long tops and carried in the hand, or thrust beneath the girdle. Planché ("British Costume") merely says, In time of Edward I. the mail-gloves of the hauberk were now divided into separate fingers. Is not habergeon (see p. 69) the diminutive of hauberk?—*R. T., M.A.*

HODDY-DODDY (p. 70).—Additional passages bearing upon this reduplicated form have occurred to me. Hod-dod, a snail (Northamptonshire); oddy-doddy, a river-snail (Oxfordshire). These are given in the "Dictionary of Reduplicated Words," by H. B. Wheatley, in an appendix to the Philological Society's "Transactions," 1865. "H. B. W." defines the term to mean, "a short, clumsy person, either male or female—a foolish person," and gives illustrative passages.—*R. T., M.A.*

PRICKMADAM (p. 70).—When I asked what plant was designated by this name, I thought possibly it might have some connection with prickwort and prickwood (*Euonymus Europæus*, L.), but a further consultation of the old writers has shown me that, though several plants—three or four—bore this name, they were all *Sedums*. Ray's "Catalogus Plantarum" gives (p. 280) the ordinary yellow prickmadam, *Sedum minus hæmatodes*, Ger. (*S. reflexum*, L., vide "Flora of Middlesex"), and the white-flowered prickmadam, *S. minus officinarum*, Ger. (*S. album*, L., *ubi supra*), edit. 1670. The former is also called ordinary prickmadam by Parkinson, "Theatrum Botanicum" (1690), p. 733. I am not clear as to whether Parkinson's *Vermicularis fruticosa altera* (p. 732), or shrubby prickmadam, is the same as Ray's second plant above given. W. How, in his "Phytologia Britannica" (p. 111, edition 1650), further mentions, "*In tectis. S. medium teretifolium*, Lobel. Ger., small prickmadam." These references will be sufficient for identification of the plant intended on p. 70.—*R. T., M.A.*

ARUNDO PHRAGMITES, L. (p. 19).—"R. W." is not quite accurate in his reference to Ray's "Synopsis." He says that mention is made by Ray of the monstrosity "*Gramen arundinaceum*, 30 pedes longum"; whereas Dr. Bromfield, "Flora Vectensis" (p. 615), supplies the correct reference to Ray, "Synopsis," ed. 3tia.—"Indiculus Plantarum Dubiarum" (a work which appeared in 1724, after Ray's death). This indiculus was appended to the "Synopsis" by, I presume, the editor, J. J. Dillewins (see "Flora of Middlesex," p. 10). The original publisher of the locality, so far as I can ascertain, was Merrett, in his "Pinax" (p. 49), "on the south of the Isle of Wight, by the sea-side, towards the point."—*R. T., M.A.*

A GHOST STORY.—One evening, a few months ago, as two gentlemen were sitting conversing together, they were disturbed by a singular commotion in another portion of the house. Presently the butler made his appearance at the door of the room, followed by the rest of the servants, and in great dismay said that there was a ghost in the pantry. As the gentlemen expressed their unwillingness to believe this, the butler requested them to come out of the room, and they would hear for themselves. On going out, they certainly heard a series of loud knockings, and sounds of most unearthly character, proceeding from the direction of the pantry. To satisfy themselves as to the cause of these noises, having procured lights, they opened the door, and, on the floor of the pantry, there was a poor cat, with her head fixed firmly into an earthenware jar, which she was vainly attempting to break, and in this manner produced the mysterious knockings; whilst every now and then her cries of agony, uttered in a close jar, produced sounds of the wildest and most dismal character. For a few minutes they stood still, amused with the absurdity of the whole scene. Then, remembering that what was



amusing to them was misery to the cat, they hastened to set her free; carefully breaking the jar, so as not to hurt the cat. No sooner was this done, than a mouse, which had been attracted and caught by a little meal at the bottom of the jar, leaped out, having been, no doubt, the unwitting cause of the cat's mishap. In breaking the jar, the part through which the cat's head had been forced still remained round her neck, like a ring; and for some time it was suffered to continue so, in memory of poor pussy's misadventure.—*J. S. Tute.*

SACKBUT (p. 71).—"G. H. H." will get ample information on this point by consulting W. Aldis Wright's article on this instrument in Smith's "Dictionary of the Bible," vol. iii., or by reference to the Lexicons of Forcellini, under *sambucus*, and Stephanus, under *σαμβύκη*.—*R. T., M.A.*

ÆSCHYNANTHUS IN FRUIT.—Inclosed pod of *Æschynanthus* was raised in a greenhouse. I send it because my gardener says the plant rarely fructifies; he never saw it before. Rare or not, it is curious.—*R. G.*

GOLDEN PLOVER (*Charadrius pluvialis*).—Mr. Harting in his interesting article (page 58), does not mention the fact that Golden Plover may often be decoyed within range by a tolerably correct imitation of their whistle. I speak from experience during the winter months only, and I have more than once "whistled" a flock of them round, so as to get a second shot,—on one occasion after the first had been successful. Single birds, and stragglers especially, may be lured in this way. I think the illustration (p. 60) represents the bird with too dark a breast for winter plumage—it is more like *pluvialis* in his summer dress.—*J. R.*

SPURWINGED GOOSE.—Allow me to make a few remarks upon two points that seem to me to call for some notice as I turn over the pages of your last number. There can be little reasonable doubt, I think, that the Spurwinged Goose, the occurrence of which in Wiltshire is spoken of by Dr. Moscs (p. 51), has no claim whatever to be regarded as a "British bird" in the ordinary sense. It is a native of tropical and southern Africa, which is never likely to stray so far north as this country of its own accord. But it is comparatively common as an introduced species in collections of ornamental waterfowl, and there are generally specimens of it in the gardens of this society. Therefore I do not doubt that the bird spoken of by Dr. Moscs, as well as those previously recorded as occurring in Great Britain, were individuals that had escaped from captivity. The Spurwinged Goose has *once* bred with us, but is not a free breeder in captivity. The other subject I wish to notice is to express regret that you should have inserted in SCIENCE-GOSSIP the silly story about Mr. Cross and his pythons (p. 64). Pythons do not produce living young ones, but eggs, which they afterwards (at any rate in some instances) incubate. Of this fact we have had ocular proof in this society's gardens. This and other similar stories which have recently appeared in the Liverpool journals are obviously concocted to increase the sale either of Mr. Cross's pythons, or of the papers that insert them: I know not which.—*P. L. Sclater, Zoological Society of London.*

ENTOMOLOGICAL SOCIETY.—A new society has just sprung into existence at Newcastle-on-Tyne, of which the secretary is Mr. Johnston, of 48, Dean-street, who will furnish all required information.

BADGERS.—A correspondent of a Cornish paper, writing from Liskeard, says that on March 4th Mr. Steel, of St. Ives, with some others, captured six badgers on his estate, near that town; three were taken alive, and weighed 84lb. I fear such wholesale destruction will soon exterminate these animals.—*H. Budge.*

TITMICE.—In your March number I read an article about the Bearded Titmouse (*Parus biarmicus*). I think this bird is nowhere so common as in some parts of my country (Holland), where it may be seen in great numbers during the months of September and October amongst the reeds. I have kept several pairs of these birds in cages, where they appeared to be very happy as long as they were kept together; but as soon as one of them died, the other began to pine, and never survived its mate more than a week or a fortnight. It is very amusing to watch these birds at night, as the male always covers the female with his wings when asleep. When one of the birds is taken away from its mate, they both express their grief by piteous cries, and do not cease until they are brought together again. Another bird of the Tit tribe, which is rather common in the large pine woods in the south of Holland, is the Crested Tit (*Parus cristatus*): I have never yet observed it in England, and as some naturalists declare that it has never been seen here, I should be very thankful if any of your correspondents would give me some information on this point.—*H. M. Labouchere.*

MUSICAL FISH.—I have also heard the Musical Fish (of which our mutual friend Mr. Spicer writes to you) in the caves of the Bocas Islands, off Trinidad. The noise I heard is a simple drumming, exactly like a steamer letting off steam, which I attributed at first to wind, or to water in caves: but I accept the native explanation. I have a specimen of the fish which is said to make the noise; but I don't believe in his power to do so. I know nothing save what I tell, and what I have read in an old unscientific "History of Trinidad." But I can find out more, and shall be happy to tell you what I find out, if I can get at what is already known.—*C. Kingsley, Eversley Rectory.*

BOTANICAL SYNONYMY.—It would be a great help to readers of the old herbalists, if there were some small work published identifying the old names with modern names of the plants. To a very considerable extent this has been done in the "Flora of Middlesex."—*R. T., M.A.*

BITTERN IN NORFOLK.—A fine male specimen of the Bittern (*Ardea stellaris*) was shot at Barton (Norfolk) on the 26th of last December, and at the same place, on the 27th, a specimen of the Black-throated Diver (*Colymbus arcticus*).—*R. J.*

SEA BIRDS NEAR GUILDFORD.—During the stormy weather in February, a specimen of the Goosander (*Mergus merganser*) and also of the Smew (*Mergus albellus*) were shot in a pond in this neighbourhood. A beautiful example of the Ringed Guillemott (*Uria lachrymans*) was also captured near a dung-heap. I can find no record of the latter ever having been taken so far from the coast. Some years ago a specimen of the Little Auk was brought me from a chalk-pit near Guildford, being picked up by a boy in an exhausted condition.—*C. Capron, Shere.*



## NOTICES TO CORRESPONDENTS.

H. R. W.—See SCIENCE-GOSSIP for 1869, pp. 119, 142, and you will find that the paragraph about Hemlock was noticed when it appeared in the *P. M. G.* Unfortunately, the bulk of extracts in "Natural History" in the "Year-book of Facts" for 1870, are anything but facts.

T. W.—It is not our rule to insert any remarks on communications which may be sent to us. Those which are required to be returned, should be so marked, and stamps inclosed with the address.

C. A.—A moth, undoubtedly the "Laekey" (*Clisiocampa neustria*).

F. C. S.—Not at all unusual, but of common occurrence.

R. R. Y.—It is unreasonable to expect us to answer or insert such a batch of questions.

S. W.—The Northern Diver is met with on some portion of the English coast nearly every year, especially in "hard winters."

S. M.—We have a record of a Queen Wasp caught January 22, which puts yours out of court.

H. F. P.—We do not name more than two specimens at a time from the same individual.

M. J. T.—If you send us anecdotes, &c., please to let them be original, and not quotations.

H. E.—"Early visitors" and accidental bees, butterflies, birds, and flowers come every spring, but we do not consider such circumstances of sufficient importance for notice. "One swallow does not make a summer," and these "early visitors" prove nothing, whilst confined to a few isolated individuals.

T. J. D.—We cannot say what seeds they are, and you give no information to assist.

A. H. S.—Have you read our "Notice" about writing names in full?

J. L.—We have several times stated that books and instruments are ineligible for our Exchange column. Your notice must be sent to the publisher, and paid for as an advertisement, if inserted.

T. W.—It is certainly not an aquatic plant, but the Marsh Bedstraw (*Galium*).

C. F. T.—*Vallisneria*, which may generally be had for a few pence at Mr. Kennedy's, Covent-garden Market; *Myriophyllum*, and duckweeds (*Lemna*).

W. W. S.—The House Ant (*Diplorhoptarum molestus*); see SCIENCE-GOSSIP for 1865, p. 170; 1868, pp. 213, 234, 261, 263. We are not aware that *Argus reflexus* has occurred in Britain.

T. A. C.—Nothing to be seen but mycelium.

E. W.—Dujardin and Hupé, "Hist. Nat. des Zoophytes Echinodermes," Paris, 1862. Agassiz, "Monographie des Echinodermes Vivants et Fossiles," 4to., 1839-42, Neuchatel. For anatomy and physiology, consult Müller's works and papers (German).

H. F. P.—No. 1. *Bilimbia sphaeroides*, Sommf. 2. *Physcia parietina*, var. *concolor*, Dieks. 3. Immature.—W. C. C.

J. C., Beds.—We can afford to let the "Dun Cow" rest now.

M. D. P.—We cannot inform you.

R. R. Y.—Send some one to Stationers' Hall with a copy of the book, and 5s.

J. C. D.—No. 1. *Turgionia hypophylla*. 2. *Weisia controversa* with *Hypnum rutabulum*.—R. B.

W. S. W. E.—No. 1. *Hypnum rutabulum*. 2. Young of a *Hypnum*, probably *serpens*.—R. B.

A. J.—No. 1 may be *Bryum subrotundum*; send fruit when ripe. 2. *Hypnum plumosum*.—R. B.

## EXCHANGES.

NOTICE.—Only one "Exchange" can be inserted at a time by the same individual. The maximum length (except for correspondents not residing in Great Britain) is three lines. Only objects of Natural History permitted. Notices must be legibly written, in full, as intended to be inserted.

STYLOPS wanted, in exchange or by purchase.—Address, Rev. H. H. Higgins, Free Public Museum, Liverpool.

CHALK FORAMINIFERA from Charlton, Kent, for other good mounted objects.—J. W. Freeman, 165, Maxey Road, Plumstead.

BRITISH PLANTS.—Southern required for northern species.—Address, F. A. Lees, Kent House, Meanwood, near Leeds.

BRITISH BIRDS' EGGS for others.—H. Durnford, Claremont House, Waterloo, near Liverpool.

DEPOSITS.—Wanted, portions of Oregon, Moron, Jutland, and Los Angeles Deposits, for good named slides of recent Diatoms.—B. Taylor, Lowther Street, Whitehaven.

LIGURIAN QUEEN BEE.—24 good slides offered for a living specimen, to add to a black stock.—G. C. Gowan, 20, Beauchamp Square, Leamington.

MICRO FUNGI.—Slides of *Polycystina*, *Diatomaceæ*, or Foraminiferous deposit in exchange for slides of Micro Fungi.—J. W. S., Crown Park, Montenotte, Cork.

FRONTLET and Horn Cores of Long-fronted Ox (*Bos longifrons*) in exchange for Lower Jaw, with Teeth, of Cave Bear (*Ursus spelæus*).—R. E. Olliver, Sherboro' House, Stamford Hill, N.E.

*D. templi* and *E. vesicolora* wanted for British Birds' Eggs.—A. Shepherd, 37, Great College Street, Camden Town, London.

CAPSULE OF MOSS (*Funaria hygrometrica*), mounted, offered for a small quantity of *Alyssum olympicum* seed unmounted, or other good objects.—John Carpenter, 16, Ifield Road, Brompton, S.W.

FLYING-FISH SCALES for other microscopical material, or for stamped directed envelope to G. E. Quick, 109, Long Lane, Southwark.

FOSSIL FISHES from the Coal-measures for a few Skeletons of Recent Fishes.—J. Ward, 25, Stafford Street, Longton, Staffordshire.

BRITISH LEPIDOPTERA in exchange for Foreign Shells, Fossils, or Minerals.—Address, F.D., Post-office, Faversham.

BRITISH FERNS (growing plants) wanted in exchange for Lepidoptera. *H. marginata*, *M. exposita*, *D. carpophaga*, and other good species offered.—John E. Robson, Groves Street, Hartlepool.

## BOOKS RECEIVED.

"Scientific Opinion." Part XVI. March, 1870.

"Land and Water." Nos. 214, 215, 216, 217.

"The Monthly Microscopical Journal." No. 15. March, 1870.

"The Animal World." No. 6. March, 1870.

"The American Naturalist." Vol. II. No. 4. February, 1870.

"The Chemical News." Nos. 531, 532, 533.

"The Dental Register." Vol. XXIV. No. 1, Cincinnati, U.S.

"Cassell's Book of Birds." Parts I. to IV.

"The Gardener's Magazine." Part LI. March, 1870.

"Note sur les Formes du Genre Capsella." Par Charles P. Hobkirk.

"Botanical Notes extracted from the Canadian Naturalist for September, 1869." By David A. P. Watt.

"Proceedings and Transactions of the Nova Scotian Institute of Natural Science of Halifax, Nova Scotia." Vol. II. Part III. 1868-9.

"A Guide to the Study of Insects." By A. S. Packard, Jun., M.D. Parts VIII., IX., X., completing the work. Salem: Naturalists' Book Agency.

"The Journal of Botany, British and Foreign." Edited by B. Seemann, Ph.D., F.L.S., &c., assisted by J. G. Baker, F.L.S., and H. Trimen, M.B., F.L.S. Vol. VIII. Nos. 85, 86.

"The American Naturalist." Vol. IV. No. 1. March, 1870. Salem: Peabody Academy of Science.

"The Quarterly Magazine of High Wycombe Natural History Society." Vol. II. No. 7. March, 1870.

"The Fuel of the Sun." By W. Mattieu Williams, F.C.S. London: Simpkin, Marshall, & Co.

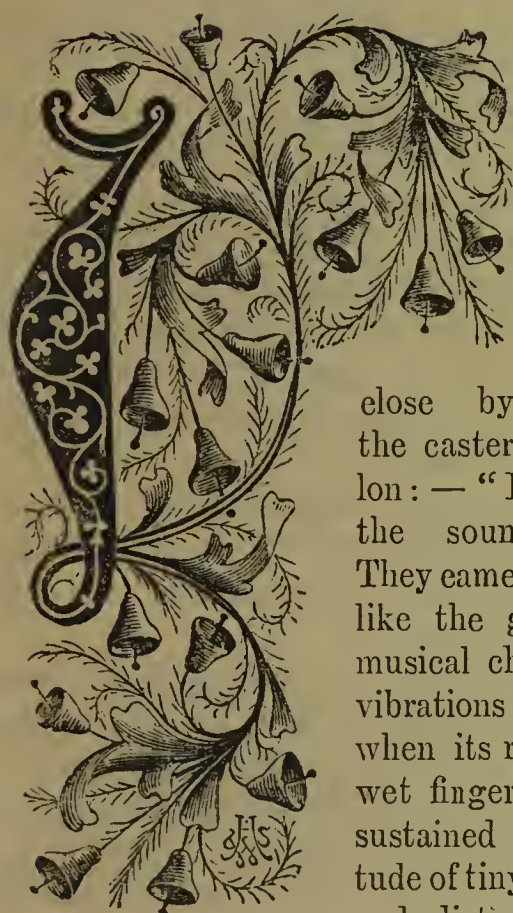
"Quarterly Journal of Quekett Microscopical Club." No. 10. April, 1870.

COMMUNICATIONS RECEIVED.—E. C.—J. H.—H. R. W.—F. C. S.—S. M.—S. W.—C. K.—C. J. W. R.—T. S.—B.—J. W. F.—G. T.—R. H.—G. H. H.—R. J.—W. B. F.—W. R. T.—W. R. H.—J. S. T.—J. R. S. C.—F. B. W.—G. C. G.—W. W.—W. C.—G. G.—H. N. B.—A. H.—D. H. S.—H. H. H.—C. A.—R. E. O.—J. W. S.—G. R.—A. J.—H. M.—M. J. T.—C. A. C.—H. E.—T. J. D.—H. F. P.—C. G. B.—C. F. T.—A. A.—W. H. M.—G. E. Q.—R. H. A.—W. H. P.—R. T., M.A.—J. R.—J. W.—J. L.—G. G.—W. S. W. E.—J. B. D.—D. K. W.—R. H. A.—T. W.—A. R. A.—G. B.—R. R. S.—W. W.—C.—A. H. S.—W. H.—H. W. G.—J. C.—W. W. S.—R. T.—P. L. S.—P. B.—E. B. F.—J. H.—G. N.—W. L. W. E.—H. B.—M. D. P.—R. A.—E. F. E.—R. G.—C. K.—J. C.—W. P.—E. H.—J. M. A.—J. E. R.—G. N.—E. F. E.





## MUSICAL FISHES.



N Sir Emerson Tennent's "Ceylon" I find the following notice of the musical sounds heard in Chilka Lake, a salt-water creek

close by Batticaloa, on the eastern shores of Ceylon: — "I distinctly heard the sounds in question. They came up from the water like the gentle thrills of a musical chord, or the faint vibrations of a wine-glass when its rim is rubbed by a wet finger. It was not one sustained note, but a multitude of tiny sounds, each clear and distinct in itself; the

sweetest treble mingling with the lowest bass. On applying the ear to the wood-work of the boat, the vibration was greatly increased in volume by conduction. The sounds varied considerably at different points, as we moved across the lake, as if the number of the animals from which they proceeded was greatest in particular spots; and occasionally we rowed out of hearing of them altogether, until, on returning to the original locality, the sounds were at once renewed." Will your readers oblige me by comparing this with the following note I published, of Musical Fishes in a salt-water creek near Bombay, in the *Bombay Times* of January, 1847?—"A party, lately crossing from the promontory in Salsette, called the 'Neat's Tongue,' to near Sewree, were, about sunset, struck by hearing long distinct sounds like the protracted booming of a distant bell, the dying cadence of an Æolian harp, the note of a pitch-pipe or pitch-fork, or any other long-drawn-out musical note. It was, at first, supposed to be music from Parell floating at intervals on the breeze; then it was perceived to come from

all directions, almost in equal strength, and to arise from the surface of the water all around the vessel. The boatmen at once intimated that the sounds were produced by fish, abounding in the muddy creeks and shoals around Bombay and Salsette: they were perfectly well known, and very often heard. Accordingly, on inclining the ear towards the surface of the water, or, better still, by placing it close to the planks of the vessel, the notes appeared loud and distinct, and followed each other in constant succession. The boatmen next day produced specimens of the fish—a creature closely resembling in size and shape the fresh-water perch of the north of Europe,—and spoke of them as plentiful and perfectly well known. It is hoped they may be procured alive, and the means afforded of determining how the musical sounds are produced and emitted, with other particulars of interest supposed new in Ichthyology. We shall be thankful to receive from our readers any information they can give us in regard to a phenomenon which does not appear to have been heretofore noticed, and which cannot fail to attract the attention of the naturalist. Of the perfect accuracy with which the singular facts above related have been given, no doubt will be entertained when it is mentioned that the writer was one of a party of five intelligent persons, by all of whom they were most carefully observed, and the impressions of all of whom in regard to them were uniform. It is supposed that the fish are confined to particular localities—shallows, estuaries, and muddy creeks, rarely visited by Europeans; and that this is the reason why hitherto no mention, so far as we know, has been made of the peculiarity in any work on Natural History." Now it was nearly impossible for Sir Emerson Tennent to have seen this, as it was altogether impossible for me to have known in 1847 anything about his visit to the Chilka Lake the following year; and both descriptions, which, so far as the sounds of the fish are concerned, are in perfect harmony, are those of independent observers speaking of the same phenomenon, which I doubt not in both cases



admits of the same solution. In 1858, the present Governor of Ceylon visited Chilka Lake; he was obviously not aware of what Sir E. Tennent had heard or seen ten years before: his book was not published till 1859. He gives the following account of the music in the water, which is as nearly as possible the same as had been previously given, Mr. Ward being once more a perfectly independent witness:—"I ought not to take my leave of Batticaloa, which I may not have an opportunity of revisiting, without mentioning the natural phenomenon for which its lake is remarkable—the singing fish. I was too ill during my stay in 1857 to expose myself in the night air upon the water; and I confess that, in spite of the impression then made upon my fellow-travellers, amongst whom were Major-Gen. Lockyer and Capt. Gosset, I went out upon the present occasion with a considerable amount of incredulity, and was the last to believe the evidence of my own senses; Dr. Johnston being satisfied as to the existence of a sound apparently proceeding from the water long before I could realize it. But after changing the position of the boat once or twice, there could be no doubt about the matter. The sound rose and swelled, and absolutely vibrated about us in a manner that left no question as to the fact, whatever may be the causes. Its character is indescribable. It is not like any other sound. It is only heard at night. It has nothing harmonious or musical about it. There are no modulations, no variety of notes, except what the increase and decrease in strength produced. As to its origin, nobody knows anything. It may be the fish, to whom it is popularly attributed. It may be the rush of air through rocks partially hollowed. There is nothing but conjecture to guide us in this respect. The results all can vouch for. And these results are certainly most distinct within a limited distance from the shore, though heard occasionally in deep water. I am no naturalist. I can only state what I personally saw and experienced. Others must explain it. Something similar, it is said, occurs in the Bay of Naples. It is strange that between Naples and Batticaloa there should be this one point of resemblance." Sir Emerson Tennent describes the same thing as heard by him at the same place in 1848; but he doubts if the sounds proceeded from fish, and ascribes them to shell-fish. The following is an extract from a letter (Feb. 1849) I received a few weeks after the first notice had been published:—"Musical Fish.—Sir,—In a late number of the *Times* I noticed some remarks respecting the Musical Fish, as they have been rather aptly termed; and it may be interesting to the readers of the *Times* to be informed that the existence of a similar phenomenon has been long known to the residents at Vizagapatam. I have heard the musical sounds, like prolonged notes on a harp, when rowing on the back water at that

station; and they were generally supposed to proceed from the fish coming in contact with the sides of the boat. To the best of my recollection, the sounds were never heard at a distance from it."—*Bombay Times*, Feb. 13.

Vizagapatam, on the Coromandel coast, is four hundred and ninety-eight miles north of Madras, the shores abounding with shallow salt-water creeks like those on the eastern side of Ceylon and all along the Malabar coast. I think that I have very clearly made out that musical fishes do exist in abundance; and as it is very difficult to conceive in what way the sounds are made under water, it would be well to have the subject more minutely inquired into.—*Dr. Buist, in the Athenæum*.

My brother, a midshipman on board H.M.S. *Agincourt*, says: "There is a most peculiar fish here (Lisbon), which makes a very loud drumming noise under the ship's bottom in the night;" but he does not give any particulars.—*Harry C. Leslie, Erith*.

In Sir E. Tennent's "Ceylon," vol. ii. p. 469, will be found an interesting account of the musical sounds proceeding from the water, which are heard at times near Batticaloa, Ceylon. The fishermen believed them to be produced not by fish, but by mollusca.—*A. W. Langdon*.

The correspondence on this subject having been submitted to Dr. Günther, our highest authority on these subjects, he has kindly furnished the following explanation.

EXPLANATION.—The musical fish which has been observed by Prof. Kingsley during his visit to the West Indies, is well known under the name of *Pogonias chromis*. All writers on North American Ichthyology speak of the "Drum," "Drummer," or "Grunts," and of the peculiar noise produced by it under water. You will find detailed accounts of it in the works of Schoepf, Mitchill, Dekay, and finally also in Cuvier and Valenciennes, vol. v. p. 196. It is a fish like the Maigre, growing to a length of four to five feet, found in American waters, north and south of the line. Other allied species are found in the East Indies, where they have also been observed to astonish the sailor by their music. So much is certain—1. That the noise is produced by this fish or similar species, which generally go about in schools or herds. 2. That the sound is not produced by the means of the air-bladder—which is perfectly closed—as some supposed. I believe the sound is produced by the action of the enormous upper and lower pharyngeal teeth, with which three movable plates in the gullet are armed. These teeth have the form of pavement-stones. I am not well enough acquainted with acoustics to say to what distance sound can travel under water; but I have no doubt that the fish can produce the sound with those teeth. It is not known whether these fishes produce those sounds when feeding; or only at certain seasons of the year.—*A. Günther*.



## THE SAND-FLY AND ITS PARASITE.

I WISH to call the attention of readers of SCIENCE-GOSSIP to an exceedingly common, because abundant, two-winged fly found on the seashore, and I dare say many other places.

Any one visiting the seaside cannot but be struck with the abundance of a greyish-black two-winged fly that flits hither and thither. Not very large, about the size of the ordinary house-fly (but somewhat less). If the said visitor have either the time hanging heavily upon him, or a taste for natural history, let him catch one of these flies. If of the first character, I say, "let him catch," &c., and, unless more clever than the general run of idlers, he'll have something to do which will no longer cause the time



Fig. 101. The Sand-fly magnified.

to hang heavy. More agile, cunning, provoking little creatures I do not know. Here is one, cautiously approaching, and stooping down, you very carefully bring your hand within reasonable distance, that you may be sure of your victim. Just one inch nearer. "Bah! he's gone." Try another. "Got him?" "Well, no; but I'll try again." Ay, try my dear friend. Don't permit such a little (aggravatingly little) wretch to beat you. "So, so; you've tried your skill on many, how many captured?" If very patient (be sure you don't lose your temper, though) you may succeed in getting one in six; and at any rate, if you can in a couple of hours show a score you'll be more fortunate than some that I wot of. Last week I met with some boys who evidently did not know what to do with themselves; so I promised them a penny for each fly they brought me within the next hour. Such a shout, and I fancy such visions of good things to come, that I fear they took me for a fool. To work they went, however,

and then made "dabs" at the sand. After a few attempts, one gave it up as being "No good." Another became suddenly virtuous, saying, "'Twas a shame to kill poor flies." A third kept manfully at it; how long I cannot say, for I went elsewhere. Returning in some hour and a half, he brought me one poor, unfortunate, straggling *blue-bottle*, saying, "He'd tried hard, but could only get hold of this one." A fly is a fly: he got a penny, though not for the proper article.

But I'm forgetting my work. If the sea-side visitor be accustomed to natural history studies, he will first watch the ways of the little creatures, and then, no doubt, will soon have one either in his net or hand. Well will he be repaid. At first blush, there is nothing to distinguish it from many another dipterous insect; but just give the little liting

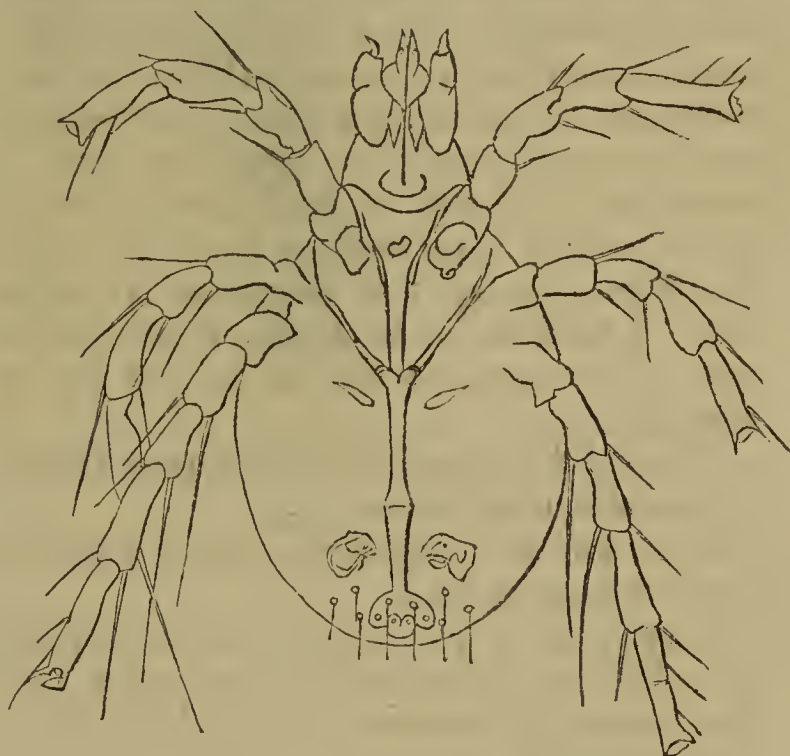


Fig. 102. The Parasite of the Sand-fly magnified.

thing a smart nip, and you transmogrify an uninteresting-looking fly into one of our modern fine ladies, dressed completely in gay garnishing, and set off by a handsome chignon of the most modish build. Taking a more careful survey, he will see how this change is brought about. A movement on the fore part of the head is observed, an inflation is seen going forward, until a bladder-like excrecence is formed, in some cases nearly as large as the head, and in some larger even than the head itself. This bladder is covered with stiffish spines closely set together, and appears to be connected with the suctorial apparatus; though what is its use I am unable at this stage of my observations to say. Judging from comparison with the dung-fly, I should say that it is closely allied to it; and, indeed, there may be seen some indication of similarity between the two in respect to the excrecence above spoken of.

Further examination has brought to light the fact that other flies, besides those mentioned above, are



similarly endowed: one or two of the dung-flies; the *Stomoxys calcitrans*, for example. It may be needful to say that in order to exhibit the chignon the fly must be squeezed, when the excrescence will be seen: in some cases a very decided nip is required before it makes its appearance; but it is there, and may be forced out. Acetic acid is peculiarly favourable in causing the extrusion of this bladder-like substance. I thought at one time that this excrescence might be connected with sex, but find both males and females have it. I ought to mention that on this fly there are occasionally to be found parasites; not the ordinary form, but one unlike any I have seen before. The length  $\frac{1}{100}$  of an inch, breadth  $\frac{1}{200}$ ; no antennæ; six legs, with hooks at the end, five joints to each leg; the head having the power to be extruded and retracted; the palpi furnished with recurved hooks, the palpi rather longer than the mandibles. There is a very distinct line or tube running from the œsophagus (I presume) to the lower part of the abdomen, where it terminates as the anal opening probably. Branching from the upper part of this tube are two others (one on each side) which end in openings, as I conceive, respiratory ducts. The colour of the creature is a delicate lilac. Altogether an interesting object, and one that any microscopist would like to make acquaintance with.

I forward drawings of both fly and parasite, which may assist in identification.

There is another parasite on some of these flies, but of an ordinary kind.

I hope some of your readers may be induced to pay a little attention to the subject which I have thus imperfectly introduced; if such is the result, I shall be repaid.

Hull.

W. HANWELL.

[I am not quite certain whether the fly is *Actora æstivum* or *Cœlopa frigida*. I am inclined to think it is the former, which is often settled on the sand or mud by the seashore. *Cœlopa frigida* swarms in seaweed on the shingle, and is not difficult to catch. If Mr. Hanwell would forward a specimen, it would be easy to ascertain the name of the species. I may mention that the name of the dung-fly is *Scatophaga stercoraria*, not *Stomoxys calcitrans*.

F. WALKER.

PRIMULA FARINOSA.—Mr. Lees having replied to a query of mine (p. 91) respecting one Ambleside plant, can perhaps tell me the time of flowering of another in the same neighbourhood—viz., *P. farinosa*. After long search in September last, I found four or five plants just out in flower on different days, and a great number of others (a hundred or more) apparently long over-blown. Were these last plants that had flowered the same season, or in the previous year (1868)?—R. T., M.A.

## THE SEA BEET.

(*Beta maritima*.)

THE Sea Beet affects a warm and humid atmosphere and a saline soil: these it finds on the shores of the sea and of tidal rivers; and if growing on a bed of clay capped with gravel or beach, there it is at home. Such a locality is found at Ventnor on the gault, and again at Shoreham on the London clay, a narrow strip of which extends along the coast almost to the boundary of the stately watering-place in that immediate neighbourhood. There the wild Beet may be seen of all sizes and ages, from the seedling to the well-established cushion of verdure which must have weathered many a season. This wild tract is little visited, and in winter, especially at its western extremity, is almost naked and uncoloured; but in the early summer all is changed: the ground glows with unnumbered blossoms of the Purple Thrift; the Yellow Stonecrop spangles the grass; the Viper's Bugloss uncoils its gorgeous spikes, well contrasting with the yellow flowers and glaucous foliage of the Horned Poppy; the Sea Catchfly clusters in purest white; the Sea Milkwort the Bird's-foot Trefoil, the Field Madder, the Daisy, and other flowering plants, supplement the scanty turf, and with the purple-stained leaves of the Beet make up a wild garden-plot of charming variety and interest.

Can this weed of our shores be the original of the cultivated Beet? It is a point which has often been considered. The authorities are generally dubious, or answer in the negative. Having, however, collected a few facts bearing on it, I beg leave to advance them, and invite the attention and help of contributors to the clearing up this difficult subject.

The Sea Beet is perennial, the cultivated (*Beta vulgaris*) biennial. The common Scurvy-grass, which is perennial in a wild state, takes a biennial habit under cultivation; and this may also be the case with the Beet. The conditions of both are very similar: other points of difference noted by Dr. Withering, De Candolle, and Sir James Smith, quoted by Sir William Hooker without comment, are that the flowers of *B. maritima* are one or two together, instead of three or four; that the flower-stem is decumbent at the base, instead of upright; and that the calyx is untoothed; but, according to Mr. Wilson's observation, quoted by Hooker in the "British Flora," and which I can confirm, the flowers of the Sea Beet are sometimes three together. The stem of the common Beet is often decumbent, and that of the Sea Beet sometimes upright. After a careful inspection of the calyces of both, I can find no difference whatever. So much for the alleged points of difference. The resemblances are many and remarkable. The forms, colours, and qualities of the roots, stems, and leaves; the seasons of flowering; the shape,



size, and colour of the pollen-grains, a very minute dodecahedron, depressed at the base, each facet having raised margins and a raised central dot (it will require a very high power and careful management to see all this). Another minute point of resemblance is striking. Hooker, in the "British Flora," quotes an observation of Mr. Wilson's, which is quite correct, that *B. maritima* has always three styles; the normal number being two. This is curious; but equally so that the cultivated Beet has the same peculiarity. Of many flowers from several plants carefully examined with the microscope, I could find none with less than three styles, and one only with four. The third style in the flower, of both kinds, is a little smaller than the other two. But we may, so to speak, consult the plants themselves on the question of their affinities. Darwin remarks, in his last great work on the Variation of Plants and Animals, vol. ii. p. 178:—"Firstly. The laws governing the production of hybrids are identical in the animal and vegetable kingdoms. Secondly. The sterility of distinct species when first united, and that of their hybrid offspring, graduates by an almost infinite number of steps from zero up to complete fertility. We can only escape the conclusion that some species are fully fertile when crossed, by determining to designate as varieties all the forms which are quite fertile. This high degree of fertility is, however, rare."

How then does *B. maritima* hybridize with the cultivated Beet? I answer, most perfectly. The Sea Beet transplanted into my garden and fertilized with the pollen of the Globe Mangel-wurzel, bore perfect seeds, and these, when sown, produced a row of plants much resembling the common long Mangel-wurzel in form and size, but of various colours, from a brick-red to pale yellow; and these roots proved abundantly fertile. The humble wilding

"Claimed kindred here, and had its claims allowed;"

indeed it took so nearly the form and character of its highly-cultivated relatives that it was not thought worth while to continue the experiment.

These facts will, it is hoped, warrant the contention that we have in the Sea Beet the original of the common Beet of our gardens, and that this might be raised by cultivation and selection from the wild plant, just as the garden Carrot has lately been in France from the wild carrot (*Daucus Carota*). It might, however, require the aid of hybridization to obtain the larger varieties known by the name of Mangel-wurzel; and this has been effected probably by accident. I notice with satisfaction that Professor Rhind heads his chapter on the cultivated Beet with the names "*Beta maritima*," "*Beta cicla*"; implying, as I understand him, that in his opinion the cultivated kinds have originated from one or both of these. *Beta cicla* is the wild Beet of Spain and Portugal, which has long been cultivated in gardens

under the name of Chara. It will readily mix, Miller says, with the common Beet, from which it differs in the great size of its leaves and leaf-stalks. It may therefore be considered probable, according to Rhind's suggestion, that the Beet has been largely increased in size and foliage by the union of these two varieties.

The common Globe Mangel-wurzel has been taken as a standard of comparison throughout these observations, because it could be readily procured, and is, besides, a variety of the Beet to the cultivation and selection of which modern agriculturists have chiefly given their attention. S. S.

## NEW BOOKS.

ALTHOUGH we do not profess, within our limited space, to give elaborate reviews of "new books," yet from time to time works are issued from the press which newspapers and literary journals pass by, with a short observation or two, or a confession that the subject is hardly within their province. Some of these books our readers would be glad to be made acquainted with, and of such is the first upon our table.

*A Manual of Zoology, for the Use of Students, with a General Introduction on the Principles of Zoology.* By Henry Alleyne Nicholson, M.D., D.Sc., M.A., &c. Vol. I. Invertebrate Animals. 8vo., pp. 322. London: Robert Hardwicke.—This is just the book that has been inquired for over and over again, and here is the first, and most useful volume, nicely got up, at a reasonable price, and well illustrated. In its preface, the author declares that "he feels bound to acknowledge with gratitude the very great assistance which he has derived from the various works of Professor Huxley." The classification and characters of orders, sub-orders, divisions, families, &c., of invertebrate animals, based on the works of Professor Huxley, is quite enough recommendation for the majority of our readers, who are constantly seeking from us just the information which this little volume affords. It is marvellous what a fund of valuable matter this book contains, and with its glossary of twenty-four closely-printed pages, and its full and comprehensive index, is quite a pocket cyclopædia of the Invertebrates. Henceforth, let no correspondent inquire of us on points so readily answered by this book; and whilst our labours are considerably lightened, we shall be as grateful to the author as the purchasers of the work are certain to be.

*The Fuel of the Sun.* By W. Mathieu Williams, F.C.S. 8vo., pp. 224. London: Simpkin, Marshall, & Co.—"This little work is an attempt to explain some of the greatest mysteries of the universe." So commences the author in his preface.



From the contents of the book we are led to the conclusion that many more subjects come under consideration than that suggested by the title—the atmosphere, solar light and heat, sun-spots, the origin of meteorites, the moon, Mars, Jupiter, Saturn, Uranus, Neptune, and the Nebulæ. Yet all appear to be associated with the author's theory, upon which we shall not presume to offer an opinion. The book has been written by the light of modern investigations, and is characterized by more of candour and less of dogmatism than is usually associated with the propounders of new hypotheses. Those who are interested in solar phenomena would do well to give the book a careful perusal.

*A Guide to the Study of Insects, &c.* By A. S. Packard, Jun., M.D. Salem: Naturalists' Book Agency.—We are glad to find this volume completed with the tenth part, which has lately reached us. Although we cannot altogether accept Dr. Packard's reasons as sufficient for including spiders, mites, and some other creatures amongst insects, yet we most heartily welcome the "Guide" as an excellent introduction to the study of insects, divested as much as possible of technicalities, and reduced to a popular treatise. Unfortunately, it is by no means so easy as it should be to obtain American books in this country; with greater facilities in this direction, and the price announced in shillings, and not in dollars, Dr. Packard's book—and other natural history publications—would sell as well in England as in America.

*The Book of Nature and the Book of Man, in which Man is accepted as the Type of Creation—the Microcosm—the Great Pivot on which all Lower Forms of Life turn.* By Charles O. Groom Napier (of Merchiston), F.G.S., &c. With a Preface by the late Lord Brougham. Illustrated with Photographs and numerous Woodcuts. 8vo., pp. 480. London: John Camden Hotten.—We have given the title in full, in order that our readers might gather therefrom the nature of the book which Mr. Napier has given to the world. In another page an extract will be found which will illustrate the style in which it is written, although a single extract is hardly a fair sample for a whole book. This volume is neatly and tastefully "got up," and doubtless has cost the author a vast amount of laborious plodding; yet, for all that, with all its eloquence, and its poetry, and its pictures, and its analogies, all we can say of it is—that it is ingenious, and sometimes clever. Doubtless the author's friends, from Lord Brougham downwards, think it a wonderful book. We do not claim the honour of personal friendship, and a participation in the verdict. There are stupid people in the world, who will not "bow down" when they are commanded. Perhaps we belong to the "stupid people," if not to those alluded to by the author at page 193, viz.:—

"The Common Toad (*Bufo vulgaris*) has been

much reviled as a poisonous creature, and certainly the moisture exuding from the glands in its back and sides is a somewhat corrosive liquid, poisonous to animals, and not wholesome to man. They are humble and generally inoffensive reptiles, which crawl along at a slow rate, and pick up slugs and other injurious creatures in our gardens.

"Those men who flatter others in an obsequious manner are called 'toadies,' from the analogy they show with the habit the toad has of licking the slime of the slug. Human 'toadies' frequently possess disagreeable or injurious qualities, which do not, however, injure the more noble specimens of humanity. The toad is only dangerous to the smaller and inferior animals."

### THE ELM QUESTION.

MY compliments to Mr. Holland, and I assure him I have "studied" but little "the natural history" of this tree. I stated a simple fact, what I had seen; and in truth had no idea at the time that it was an uncommon or rare occurrence. I was contradicted, and then I asked (through the kind medium of a gentleman well up in horticulture, and acquainted with some of our leading horticulturists) for a little information on the subject of the Elm bearing fruit in this country. I do not quote the replies, as the gentleman I allude to is, I understand, going to do so in the pages of SCIENCE-GOSSIP.\* Suffice it for me to say to Mr. Holland, they are in favour of my assertion. I would also assure him that I never attempt the "science"; I leave that, as it is right I should, to the lords of the creation. I only try the "gossip," as more suitable to my sex.

"R. H. A." says, in the February number of SCIENCE-GOSSIP, p. 46:—"But does not your fair correspondent let her 'imagination' rather run away with her? She says, for instance, of the Elm tree, 'a whole page might be filled with its *uses*,' " &c. &c. Now I look in the dictionary for the right meaning of the word useful, and I find *utilis*; so, in my reply, when detailing the "uses" of the Elm, I make use of the word "utility," and get politely informed by "R. H. A." that "his words did not bear the construction I put on them." Is your correspondent a member of that learned profession of whom a certain author writes:

"I know you lawyers can with ease  
Twist words and meanings as you please"?

If so, I decline to avail myself of the privilege accorded me by the courteous editor of SCIENCE-

\* Having announced the close of the discussion in our last, we cannot insert any further communications thereon.—  
ED. S. G.



Gossip,—the last word on the Sackbut question; and with due thanks to "R. H. A." for the sure-footed animal his "imagination" so kindly wishes to place me on, beg to assure him that when I rode I preferred a faster steed. I liked riding to hounds, not market; had no objection to taking a stiff rail or sound bank; though I never affected stone walls or a "bullfinch."

Mr. Britten I really cannot have anything to say to, since he comes the Grand Turk so strongly, and visits "the brother of the sun and moon." There, in such celestial company, together with "Dobbin," I must leave him for the present, contenting myself to "pick the bright and beautiful" nearer home.

H. E. WATNEY.

### HINTS FOR DISSECTORS.

OF the numerous paths into which natural science draws its devotees none presents so many advantages and charms as that of dissection. It is a skilful and beautiful art, which is easily learnt, and I intend here to lay down a few simple rules, gleaned from my own experience, for the benefit of some of the readers of SCIENCE-GOSSIP, as I strongly inculcate the principle of studying the structure with reference to the habits, and the habits with reference to the structure.

The implements are the first consideration. To begin with, it is highly necessary to be supplied with a sufficiency of good knives. Implements are expensive, and I would advise, as cheapest in the end, and far more convenient, the purchase of one of Weiss's Dissecting-cases. It contains six knives of graduated sizes, a pair of large and stout scissors for rough work, a pair of smaller ones for more delicate manœuvres, a pair of strong forceps, a blowpipe for wafting away delicate tissues, distending stomachs, &c., and three sharp hooks, each connected to a centre ring by a chain, which are exceedingly useful for hooking back limbs and flaps of skin which constantly are coming in the way. This set of instruments, which costs one guinea, is inclosed in a neat and portable case. The great difficulty is to keep the knives sufficiently sharp; but if you live near a town, it is easy to get them sharpened at a cutler's at a trifling cost.

The next requisite is a dissecting-board. It may either be the top of a deal table, or, still better, a separate oaken slab about two feet long and eighteen inches wide, which will suffice for all specimens of moderate size. You may then set to work in the following manner. Place a good-sized deal table, if possible used for no other purpose, in a window with a good light; spread a towel over it; on your right hand lay open your case of knives; put your oak board in the middle of the towel, the edges of which spreading round are exceedingly handy for

wiping the implements upon; at the left-hand corner of the table let there be a saucer for the portions of flesh you remove; in front of you station a tumbler of water, which is useful for a variety of purposes; supply lastly a handful of cotton wool to stanch the flow of blood if perchance you pierce one of the larger blood-vessels of your subject. Then seating yourself on a high stool at the table and taking some mammal, as for instance the rat, your equipment is complete, and you may commence work.

I prefer to begin with the digestive organs, since they are the parts most subject to corruption. With the scissors cut a long slit across the abdominal coat on a line with, and a little below, the ribs. From the centre of this, cut another slit downwards between the legs, either folding back or cutting off these flaps of skin, when a beautiful sight will be disclosed. Remove the intestines first, and cutting them through at the rectum and also at their connection with the stomach, seize them with the pincers with one hand, and with the knife in the other, by steady pulls and dexterous cuts the great mass will soon be freed. They may then be stretched out, measured, and their internal coats, and the nature of their contents, examined. Now disengage the stomach, care being taken not to puncture it in the operation. Its contents must be squeezed out through the pylorus and critically examined,—in many animals much interest depending upon this point. The stomach should then be washed, both inside and out, in the tumbler of water, until it is perfectly clean, and tying a piece of strong thread tightly round the lower orifice and inserting the end of your blowpipe into the upper one, tie a second piece of thread round it, inclosing the pipe with it. Holding the two ends tight, blow into the blowpipe until the stomach is well distended with air; then with your mouth drawing out the pipe, at the same moment pull the thread tight, and, securing it with a knot, it may be hung up to dry. It is, however, a performance which requires some knack to do successfully: either it is filled too full, and on a rise of temperature it bursts, or else enough air is not supplied, and it rapidly shrivels. Practice, however, will soon teach you the right medium.

On the right side opposite the stomach is the liver, with which the gall-bladder is connected. Beneath all, and on each side, are the kidneys, the cellular structure of which is interesting.

The dissector should next proceed to the heart and lungs. Having removed the diaphragm, that large muscular membrane which divides the thorax from the abdomen, it is far from easy to separate the circulatory and respiratory organs from the rest of the body, and it is necessary at the same time to disengage the trachea or windpipe, which unavoidably destroys to a certain extent some of the muscles of the neck. It should be separated from the head



at the epiglottis—that lump which is popularly known in man by the name of Adam's apple. After detaching it in its course down the neck, which is easily done, it must be pushed through into the thorax, and seized with the forceps with the left hand, and with the assistance of the knife the attachments of the heart to the chest separated. In a few moments you will be able to draw it out uninjured, flanked by the lungs, and with the trachea rising from the centre. Dissecting this will be a charming occupation. You should notice whence the aorta, or great artery, starts, where the arteries branch forth to supply the head, where the vein enters carrying back the impure blood, and the arteries which carry the blood to the lungs to be purified, and the veins which return it to the heart. Next examine its structure: its four compartments; right and left auricle and right and left ventricle; its valves, muscular coats, and ligaments; the bifurcation of the trachea to each lung; the numerous branches of the bronchi; the structure of the trachea and of the epiglottis. If all this were done thoroughly, it would afford the dissector many hours of delightful study.

The viscera being disposed of, the head must now receive your attention. Here there are both muscles and nerves, veins and arteries to be dissected out, without destroying them all in the act. And this being impossible, it is necessary to select one or other of these points and sacrifice the rest. If the specimen is a kind of which you can get several with ease, you may devote one to each particular; but if it is a rare and unusual animal, the muscles bear the most importance. Investigating these is a laborious undertaking. You must carefully dissect away until you pretty well detach each muscle from its fellows along its entire length. You must then note its origin, or, in other words, from whence it takes its rise; its insertion, or where it goes to. Then its use must be determined. This may partly be done by observing what two portions of the frame it connects, and partly by pinching and irritating the muscle, when it will contract as it did when instigated by the brain. Those governing the complicated movements of the jaws and the neck will be traced with interest.

In the fore-leg or arm the same plan must be followed; often by pinching its muscles you may make the paw suddenly close up, clenched as if in defiance. The muscles of the hind-leg having been likewise identified and separated, you may proceed to the examination of the nerves of the opposite fore-leg, tracing them from their source and disentangling them from their course among the muscles. The second hind-leg may be devoted to the observation of the veins and arteries; the former having valves opening upwards, and the blood in them of a darker colour than that which is in the latter. It must be kept in mind that the connection between the arteries and veins is by capillaries, which are hair-like vessels

invisible to the naked eye. It would be a delightful exercise to devote an entire animal exclusively to the circulatory system, tracing from the heart the arteries spreading to the head, body, and legs, and the veins returning it from all these diverse parts again to the heart. It is best to select a moderate-sized specimen for this, since then, if a vessel is cut, the amount of escaped blood is not so great.

In small animals little can be done to the eye; but in large ones, such as the sheep or the ox, there is perhaps nothing that will give more delight. The purity of the vitreous and aqueous humours; their peculiar semi-firm and semi-fluid consistency; the beautiful blackening of the middle coat; the lens, the retina, and the exit of the optic nerve to the brain, are all objects of admiration. The eye must first be extracted from its socket, its security in which is astonishing. There is little fear, however, of piercing it, as its consistency is correspondingly great.

The dissection of the ear is attended with great difficulty, as all its important parts are lodged in the temporal bone, and it would be useless to attempt here to give any directions on the subject.

When you have traced the connection of the nose with the mouth, the cleft of the nostrils, their pituitary glands, and the fine network of nerves spreading over their delicate surfaces, you may proceed to the brain. This may be got at by carefully sawing asunder the skull at the jointure between the two parietal bones, care being taken not to cut and injure the delicate substance below. Then observe that it is divided into two separate portions,—the upper brain, or cerebrum, and the lower brain, or cerebellum; that the great spinal nerve proceeds from the little brain, or cerebellum; that the cerebellum is formed of two hemispheres; that it is convoluted in structure, whilst the cerebrum is in layers, or laminated; that nerves branch off through little apertures in the skull to the eyes, nose, ears, mouth, and so on; and that the two hemispheres of the brain are subdivided into smaller lobes. The spinal nerves branching from the great cord, with the two roots to each,—the one the root of the nerve of motion and the other the root of the nerve of sensation—should be observed and followed.

The soft part of the animal frame is now finished, and the skeleton alone remains. But this in itself would take a separate article to demonstrate.

Cutting oneself whilst dissecting often turns out a very serious affair, and great care must be taken to avoid it. The most efficient remedy is to suck the wound, and then to hold the finger for some time in cold water, and not to take too rapid measures to arrest the bleeding.

Cautioning the anatomist to persevere, I wish him good speed in the cheery and sunny path of comparative anatomy.

Bouton.

EDWARD FENTONE ELWIN.



## THE PUSS-MOTH.

*(Cerura vinula.)*

THE caterpillar of this moth is well worth a passing notice, as there is a peculiarity in its organization which we find nowhere else in insect-dom, and which is well expressed in the generic names given it from time to time. Thus the Bavarian zoologist Shrank designated it *Cerura* (Horn-tail), towards the end of the last century; in 1829, Latreille rechristened it *Dicranura* (Fork-tail); and some years later another distinguished Frenchman, Lamarck, classed it with some other species, under the name of *Furcula* (Little Fork). All these terms point to a very curious form of tail, which marks this caterpillar. An ordinary caterpillar, as every one knows, has the tail end of the body of about the same size and appearance as the middle or head; moreover, it is furnished with two claspers or prolegs, constituting the last of five pairs of these useful members. Not so *Cerura*; the body fines off into an almost pointed apex, and the anal claspers are converted into a pair of long rough tube-like appendages, each of which contains a thin threadlike process, which the animal can thrust out at will and move rapidly in every direction. This it does when irritated, and it is a fair inference that these whips are a means of defence against parasitic flies and other enemies. The caterpillar's tail being naturally elevated (and the head too, when feeding is not going on), the range of the whips extends pretty well over the whole surface of the body. Although, therefore, these instruments cannot inflict injury, nevertheless their appearance, as they lash the air, must be sufficiently formidable to a vagrant sand-wasp or a marauding ichneumon-fly.

But *Cerura* is still further protected by its colour, which is a light green—of that tint so well expressed in botanical language by the word *læte virens*,—with some spots and bars of a brownish hue; so that it looks wonderfully like a leaf carelessly rolled up, especially in the early part of the summer before the leaves have become dark and dusty.

If we follow the caterpillar to its chrysalid state, we find it still sheltering itself under the wonderful law of "protective resemblance." As the period of its metamorphosis draws on, the animal selects a spot on a poplar or willow, and commences to gnaw the bark and wood into fragments. These it cements together by means of a viscous fluid, so as to construct in the end a cocoon of great hardness, so exactly resembling a natural excrescence on the tree itself, that it requires very sharp eyes to detect it.

I have before me at this moment one of these cocoons which was made under rather curious circumstances. Last summer I brought home a Puss-

moth larva and placed it in a tumbler with proper food. At the end of three weeks it became restless, left off eating, and wandered rapidly about its prison, evidently looking out for materials wherewith to build its cocoon. It so happened that I was unable to get a fitting twig at the moment; I therefore by way of substitute gave it the bottom half of a common wooden chip box. The caterpillar appreciated my well-meant efforts, for it crept under the box, and very soon on applying my ear to the tumbler, I could hear a gnawing sound like that given out by a mouse behind a wainscot. On reversing the box at the end of a few days, I found a neat cocoon fixed firmly to it, and composed of its broken-up fibres. The cocoon was of a dark-brown colour, excessively hard, with an irregular surface, and altogether very similar to a knob or wen so often seen on a tree stem. The little architect completed its work in July; but the moth has not yet issued from its temporary grave.

Havre.

W. W. SPICER.

## APTEROUS INSECTS.

THE Rev. W. W. Spicer, in SCIENCE-GOSSIP for March, has, in his article on "Apterous Insects," advanced certain statements which are not, I believe, quite in accordance with the views of the best entomologists of the present day. Will Mr. Spicer excuse me, therefore, if I ask him to have a friendly "gossip" on these matters? It will be needless to discuss the question of how many orders of insects there are, save to remark that surely Mr. Spicer understates the number at eight; ten to twelve being more in accordance with the most modern ideas. Does Mr. Spicer think that the genus *Trichondyla* should be removed from the *Cicindelidæ* and placed among the *Carabidæ*, or does he consider that (as would seem from the context) the first of these families should be included in the latter, and not hold an independent place as heretofore? Passing on to the Lepidoptera, I should be glad to learn the use of perpetuating unintelligible and useless "English names" of Lepidoptera? For how many collectors of moths will know that by the "Mottled Umber" and the "Scarce Umber" are meant *Hybernia defoliaria* and *H. aurantiaria* (*Errannis* and *Lampetia* being merely synonyms or subgenera of *Hybernia*, and, by the way, the female of *H. aurantiaria* not being quite apterous); and would not those who do not collect moths be as much enlightened by the scientific as by the "English name"? In thus deprecating the use of "English names," I do not for a moment wish to suggest that our common birds, flowers, &c., which have *well-known* English names, should be called in "gossip" or conversation by their scientific "appellations." If, however, the "English names" of Lepidoptera are used, care should be taken that



they are applied correctly, and not to give, as Mr. Spicer (no doubt inadvertently) has done, the name "Spring Usher," which belongs to *Hybernia leucophæaria*, to *Anisopteryx*, nor that of "Chimney Sweep," applied (usually) to *Tanagra chærophyllata*, to *Fumea*. Of course, Mr. Spicer is only joking when he charges Nature with having forgotten (an expression of doubtful propriety for the pages of a scientific journal) to supply the females of the *Psychidæ* with legs and antennæ, as the females of the genus *Fumea* have both legs and antennæ! Will Mr. Spicer also kindly explain how the legless females contrive to come out of their cocoons and perch themselves on the outside? The truth is that the females of the genus *Psyche* (which includes *Sterrhopteryx*) have neither legs nor antennæ, and never quit the case in which they spent their lives as larvæ, but that the females of the genus *Fumea* have both legs and antennæ, and, on attaining the perfect state, come out of their cocoons and sit on the outside. Passing over the next three orders, we find the "Springtails" (*Thysanura*) and "Birdlice" (*Mallophaga*) placed by Mr. Spicer among the *Orthoptera*. Some entomologists place the Dragonflies proper in this order, but on what grounds are the "Birdlice" and "Springtails" included in it? Finally we arrive at the *Hemiptera*, and as I am one of the few in Britain who take an interest in this order, I think I have just cause for holy indignation at finding the disgusting *Anoplura* (the Louse, *et id genus omne*), which are probably not insects at all, shoved in among my pets!—*F. Buchanan White, M.D. Edin., Perth.*

#### D'ORBIGNY'S FORAMINIFERA.

CONTINUING the figures of Chalk Foraminifera from our April number, we must refer such of our readers as omitted to read that paper to observations therein made as to the intention and mode of these communications, and our reasons for adhering to the order and nomenclature of the original Memoir.

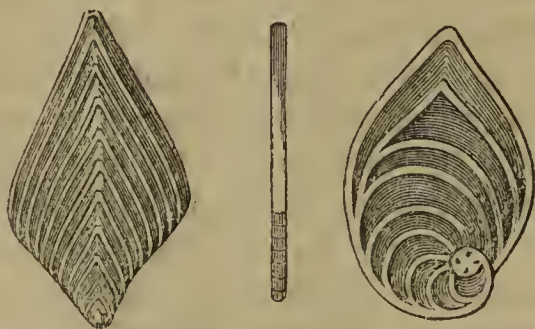


Fig. 103. *Flabellina rugosa*.

The order which succeeds to *Stichostegia* is *Helicostegia*, divided into two families, the *Nautiloidæ* and the *Turbinoidæ*. The first of these contains three genera, and nine species.

21. *Flabellina rugosa* (fig. 103), from Sens and

Meudon. In Morris's list, this is included from Charing and the Kentish chalk. Reuss has it recorded in Bohemia.



Fig. 104. *Flabellina Baudouiniana*.

22. *Flabellina Baudouiniana* (fig. 104), although only recorded by D'Orbigny from Sens, does not appear to be an uncommon European form, and occurs in English chalk.

23. *Flabellina pulchra* (fig. 105) is the last of this genus, said to be rare at Meudon, but has been found in Kentish chalk, and in the chalk marl (we

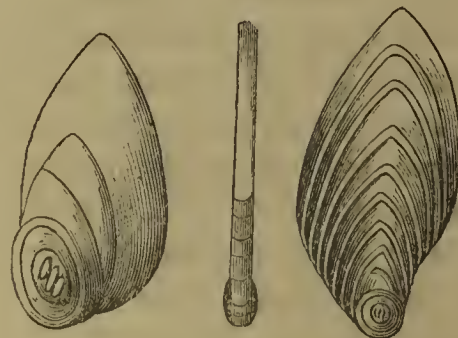


Fig. 105. *Flabellina pulchra*.

presume) near Norwich. Thus all the species enumerated in the Memoir are British.

The next genus is *Cristellaria*, and its first species one of the most common forms.

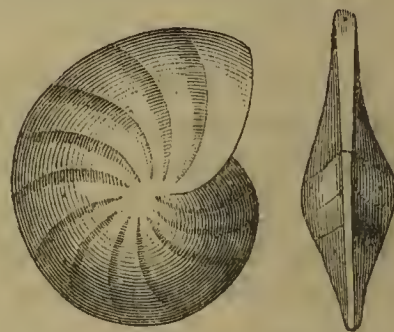


Fig. 106. *Cristellaria rotulata*.

24. *Cristellaria rotulata* (figs. 106, 107) is very

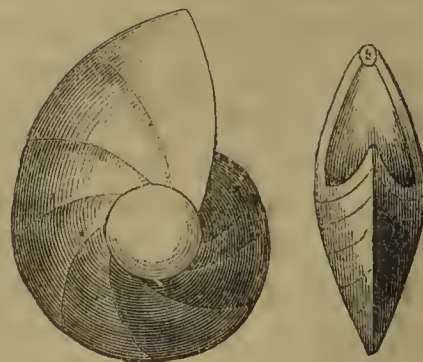


Fig. 107. *Cristellaria rotulata*, variety.

common in the French chalk, at Charing, in the chalk of England, the lower chalk of Germany and Bohe-



mia, the gault of Kent, the greensand at Warminster, Farringdon, Mans, and Bohemia, the Hilse clay of Germany, and in Yorkshire. It has been honoured with many names, some of which are included in Morris's Catalogue, and has been often figured.

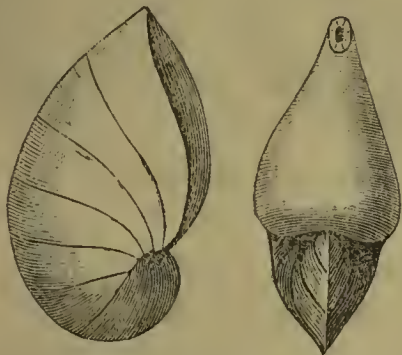


Fig. 108. *Cristellaria navicula*.

25. *Cristellaria navicula* (fig. 108) is said to be rare at Sens and Meudon, but is recorded in the Kentish chalk.

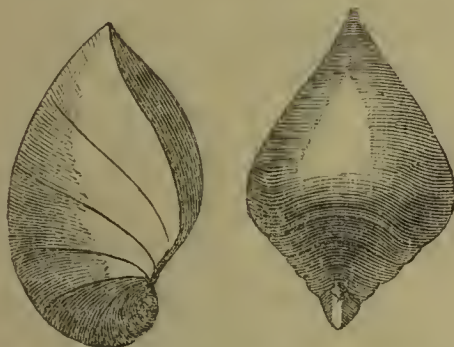


Fig. 109. *Cristellaria triangularis*.

26. *Cristellaria triangularis* (fig. 109), although stated to be very rare at Sens, does not appear to be at all an uncommon form. It has been found at Charing, in the gault at Folkestone, and in the chalk of Kent and Bohemia.



Fig. 110.  
*Cristellaria recta*.



Fig. 111.  
*Cristellaria Gaudryana*.

27. *Cristellaria recta* (fig. 110) is another rare species at Meudon and St. Germain, but Morris records it from Charing.

28. *Cristellaria Gaudryana* (fig. 111) is the last of D'Orbigny's forms of *Cristellaria*, said to be obtained solely from St. Germain, and is the only one not included in the British list.

29. *Lituola nautiloidea* (fig. 112).—This single form of *Lituola* is very common at Sens, and more rare in other parts of France. It is a common European species, and occurs at Charing, and in the chalk of England.

The other family of the order *Helicostegia* contains ten genera, and some very widely distributed forms.



Fig. 112. *Lituola nautiloidea*.

30. *Rotalina Voltziana* (fig. 113) is very common

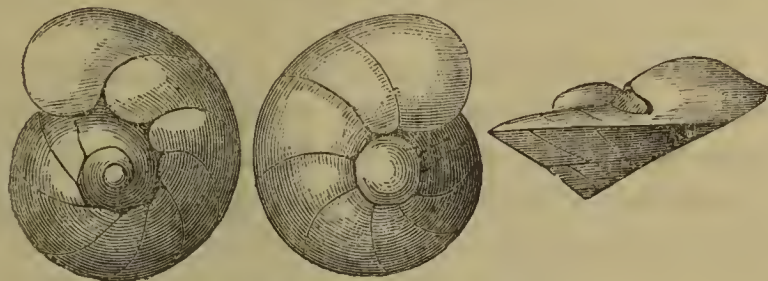


Fig. 113. *Rotalina Voltziana*.

at Meudon, St. Germain, and in English chalk, as well as at Charing.

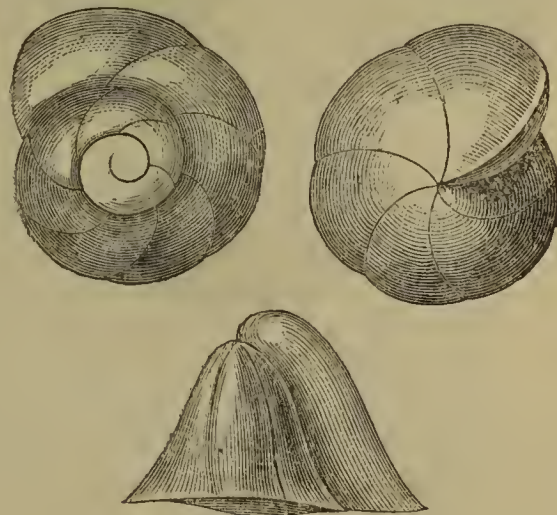


Fig. 114. *Rotalina Micheliniana*.

31. *Rotalina Micheliniana* (fig. 114) is common at Meudon, St. Germain, and England, but rare at Sens. Also found in other parts of Europe, and is figured by Reuss from Bohemia.

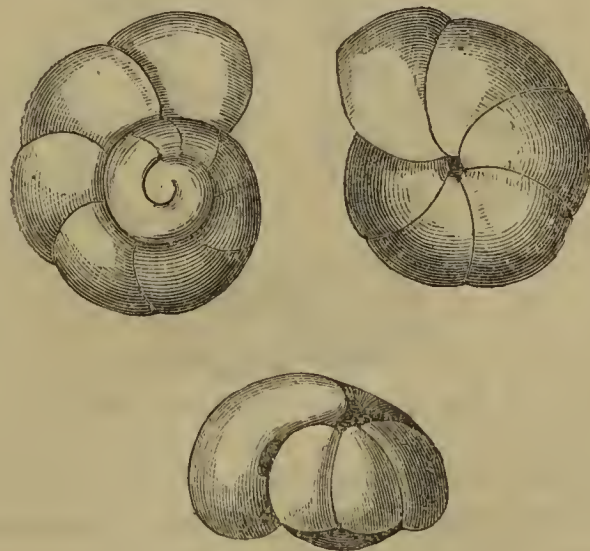


Fig. 115. *Rotalina umbilicata*.

32. *Rotalina umbilicata* (fig. 115), recorded as common at Meudon and St. Germain, is found at



Charing, in Gravesend chalk, in the gault at Folkestone, in the tertiary in Austria, and living in the Adriatic Sea.

33. *Rotulina crassa* (fig. 116), said to be very rare at St. Germain, Meudon, and in England.



Fig. 116. *Rotulina crassa*.

34. *Rotulina Cordieriana* (fig. 117), found by our author at St. Germain and Maestricht, and also occurring in English chalk. Thus, it will be observed, that of five forms of *Rotulina*, all are recorded in the British isles.



Fig. 117. *Rotulina Cordieriana*.

The present communication will conclude with *Globigerina*, of which two species are given. It is no part of our design to enter upon the discussion whether they are distinct in themselves, or distinct from the form so common everywhere in a living state. Some are of opinion that all are specifically the same. Perhaps they are right.



Fig. 118. *Globigerina cretacea*.

35. *Globigerina cretacea* (fig. 118).—Of this D'Orbigny states that he found one single example at St. Germain, and more from England. It is certainly a common European form.

36. *Globigerina elevata* (fig. 119), stated to be common in the environs of Sens, but rare in England.

Of the sixteen species included in the present instalment, all but one are recorded as British. One

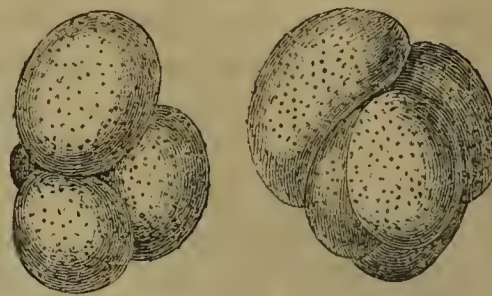


Fig. 119. *Globigerina elevata*.

other communication will shortly follow, which will include the remaining eighteen species, and complete the figures given in D'Orbigny's Memoir.

## THE CUCKOO.

(*Cuculus canorus*.)

LONG before a decided taste for ornithology had possessed our youthful mind, when we ran hither and thither in the early spring, to pluck the first cowslip and the "nodding violet," did we start and pause on hearing the Cuckoo's note; and as we watched the plain grey bird flit from the ash-tree, and skim hawk-like across the meadow, we longed to have him in our hands, and, childlike, see how he made the noise. Where he came from, or why we only saw him between April and August we could not tell. There was always a mystery about the bird which we could not fathom, and we never listened to his note, or crept stealthily along the hedgerow to try and see him, without a feeling of wonderment and awe. This feeling has of course long since passed away; but even now we never hear our old friend without an indescribable sense of pleasure, which is heightened by the old associations which are recalled, and the recollection of the happy careless days when the note of "Cuckoo" first made so great an impression.

Since that time many a Cuckoo and Cuckoo's egg has passed through our hands, and many excellent opportunities have we enjoyed of studying the habits of this curious bird.

Considering the amount of attention which has been bestowed upon the Cuckoo by naturalists in every age down to the present, one might readily suppose that every fact in connection with its life-history was now pretty generally known. But such is not the case. There are still certain points which require investigation, and which, owing chiefly to the vagrant habits of the bird, are not easily determined.

How can it be ascertained with certainty, for example, whether the same hen Cuckoo always lays eggs of the same colour, or whether (admitting this to be the case) she invariably lays in the nest



of the same species—that is, in the nest of that species whose eggs most nearly approximate in colour to her own?

And yet we must be satisfied on these points if we are to accept the ingenious theory of Dr. Baldamus. If we understand the learned German rightly, he states that, with a view to insure the preservation of species which would otherwise be exposed to danger, Nature has endowed every hen Cuckoo with the faculty of laying eggs similar in colour to those of the species in whose nest she lays, in order that they may be less easily detected by

Newton, has appeared in *Nature* (18th November, 1869).\*

To enter fully upon the details of this interesting subject, would require more space than we have at our disposal; we can only glance, therefore, at the general opinions which have been expressed in connection with it.

If the theory of Dr. Baldamus be correct, is it possible to give a reasonable and satisfactory explanation of it? This question has been answered by Professor Newton in the article to which we have just referred. He says:—"Without attributing



Fig. 120. THE CUCKOO.

the foster parents, and that she only makes use of the nest of some other species (*i.e.* of one whose eggs do *not* resemble her own) when, at the time she is ready to lay, a nest of the former description is not at hand. This statement, which concludes a long and interesting article on the subject in the German ornithological journal *Naumannia*, for 1853, has deservedly attracted much attention. English readers were presented with an epitome of this article by Mr. Dawson Rowley in the *Ibis* for 1865, and the Rev. A. C. Smith, after bringing it to the notice of the Wiltshire Archaeological Society in the same year, published a literal translation of the paper in the *Zoologist* for 1868. More recently, an excellent article on the subject, by Professor

any wonderful sagacity to the Cuckoo, it does seem likely that the bird which once successfully deposited her eggs in a Reed Wren's or a Titlark's nest, should again seek for another Reed Wren's or a Titlark's nest (as the case may be) when she had an egg to dispose of, and that she should continue her practice from one season to another. We know that year after year the same migratory bird will return to the same locality, and build its nest in almost the same spot. Though the Cuckoo be somewhat of a vagrant, there is no

\* Since writing the above, we have heard that a further communication from Prof. Newton has appeared in a more recent number of the same periodical, but we have not yet seen it.



improbability of her being subject to thus much regularity of habit, and indeed such has been asserted as an observed fact. If, then, this be so, there is every probability of her offspring inheriting the same habit, and the daughter of a Cuckoo which always placed her egg in a Reed Wren's or a Titlark's nest doing the like." In other words, the habit of depositing an egg in the nest of a particular species of bird is likely to become hereditary.

This would be an excellent argument in support of the theory, were it not for one expression, upon which the whole value of the argument seems to us to depend. What is meant by the expression "once successfully deposited"? Does the Cuckoo ever revisit a nest in which she has placed an egg, and satisfy herself that her offspring is hatched and cared for? If not (and we believe such an event is not usual, if indeed it has ever been known to occur), then nothing has been gained by the selection of a Reed Wren's or Titlark's nest (as the case may be), and the Cuckoo can have no reason for continuing the practice of using the same kind of nest from one season to another.

While admitting, therefore, the tendency which certain habits have to become hereditary in certain animals, we feel compelled to reject the application of this principle in the case of the Cuckoo, on the ground that it can only hold good where the habit results in an advantage to the species, and in the present instance we have no proof either that there is an advantage, or, if there is, that the Cuckoo is sensible of it.

Touehing the question of similarity between eggs laid by the same bird, Professor Newton says:—"I am in a position to maintain positively that there is a family likeness between the eggs laid by the same bird" (not a Cuckoo) "even at an interval of many years," and he instances cases of certain Golden Eagles which came under his own observation. But do we not as frequently meet with instances in which eggs laid by the same bird are totally different in appearance? Take the case of a bird which lays four or five eggs in its own nest before it commences to sit upon them—for example, the Sparrow-hawk, Blackbird, Missel-Thrush, Carrion Crow, Stone Curlew, or Black-headed Gull. Who has not found nests of any or all of these in which one egg, and sometimes more, differed entirely from the rest? And yet in each instance these were laid, as we may presume, not only by the same hen, but by the same hen *under the same conditions*, which can be seldom, if ever, the case with a Cuckoo.

Looking to the many instances in which eggs laid by the same bird, in the same nest, and under the same circumstances, vary *inter se*, it is not reasonable to suppose that eggs of the same Cuckoo deposited in different nests, under different circum-

stances, and, presumably, different conditions of the ovary, would resemble each other. On the contrary, there is reason to expect they would be dissimilar. Further, we can confirm the statement of Mr. Dawson Rowley, who says, "I have found two types of Cuckoo's eggs, laid, as I am nearly sure, by the same bird." (*Ibis*, 1865, p. 183.)

It is undeniable that strong impressions upon the sense of sight, affecting the parent during conception or an early stage of pregnancy, may and do influence the formation of the embryo, and it has consequently been asserted that the sight of the eggs lying in the nest has such an influence on the hen Cuckoo, that her egg, which is ready to be laid, assumes the colour and markings of those before her. This is not, however, supported by facts. For the egg of a Cuckoo is frequently found with eggs which do not in the least resemble it (*e.g.*, those of the Hedge-sparrow); or with eggs which from the nature of the nest could not have been seen by the Cuckoo (as in the case of the Redstart, Wren, or Willow Wren); or deposited in a nest before a single egg had been laid therein by the rightful owner. Again, two Cuckoo's eggs of a different colour have been found in the same nest. If both were laid by one bird, we have a proof that the same Cuckoo does not always lay eggs of the same colour; if laid by different birds, then the Cuckoo is not so impressionable as has been supposed.

What really takes place, we believe, is this:—The Cuckoo lays her egg upon the ground; the colour of the egg is variable according to the condition of the ovary, which depends upon the age of the bird, the nature of its food, and state of health at the time of oviposition. With her egg in her bill, the bird then seeks a nest wherein to place it. We are not unwilling to accept the suggestion that, being cognizant of colour, she prefers a nest which contains eggs similar to her own, in order that the latter may be less easily discovered by the foster parents. At the same time, we so frequently find the egg in question amongst others which differ totally from it in colour, that we cannot think that the Cuckoo is so particular in her choice as Dr. Baldamus would have us believe.

J. E. HARTING.

---

MERGANSERS.—The capture near Guildford of two species of Merganser is reported by Dr. Capron in last month's Gossip (p.95).—On the breaking up of the winter of 1866-7, several specimens, both of *Mergus merganser* and *M. albellus*, were shot in Sussex, and the Merganser family seem most plentiful in the south of England about February. Will any one inform me if this is the case, and also if it is true that the majority of smews that visit our southern shores are females?—J. R.



## HAIRS OF SUN-DEW.

IN the volume of SCIENCE-GOSSIP for last year, I was interested in some notices of Sun-dew (*Drosera rotundifolia*, L.), and, as the writers did not express some interesting facts which came under my notice during the past year, I venture to address a few lines to your readers, even from this side of the Atlantic. This charming little plant appeals so strongly to our sense of the beautiful, that I have been enticed to examine the habit of its leaves, and also the structure of the

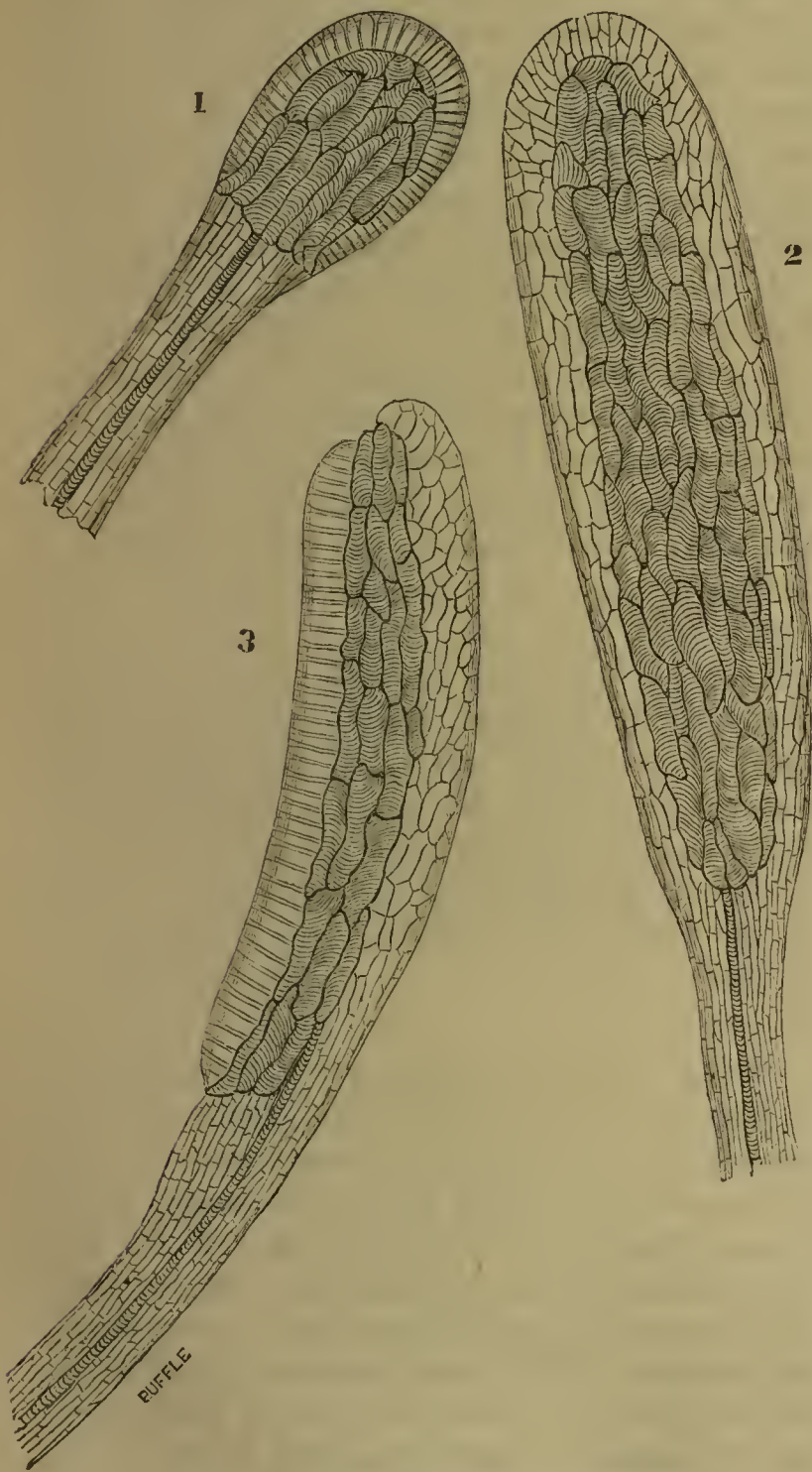


Fig. 121. Glands of *Drosera rotundifolia*.

1. Oval gland of *Drosera rotundifolia*,  $\times 130$ .
2. Cylindrical gland (front view) of *D. r.*,  $\times 130$ .
3. Ditto (side view) of *D. rotundifolia*,  $\times 130$ .

glands which are found on them. I think even botanists are not aware that two distinct kinds of glands are to be found on the leaves of the Sun-dew; at least, I have never seen the fact alluded to in the books. The rather rude drawing I have made of these glands under the camera-lucida may help to give an idea of their form and beauty. Fig. 1,  $\times 130$ , is

designed to represent the oval gland found chiefly on the upper surface of the leaf, and also on its circumference. Large spiral cells fill up the centre of each, and on these spiral cells rest others of columnar form; while *all over* its *entire* surface the sticky excretion abounds during the active life of the plant. The new glands, to which I would direct the attention of microscopists interested in botanical pursuits, are represented by figs. 2 and 3, and are to be found on long filaments surrounding the *circumference* of the leaf. They unfold sooner than those of oval shape, and are sooner to fade. These, too, have large spiral cells in the centre, but in fig. 3, which gives a side view, we observe the columnar cells occupy only the concave or inner side, and *only* on this surface is the sticky excretion to be found. Fig. 3 represents a front view of these cylindrical glands, after the preparation has been rendered transparent enough to enable its entire structure to be seen at one view. The drawings are represented magnified 130 diameters, so that a comparative view might be given of their relative size. Few objects in plant anatomy are more beautiful than these singular organs, when properly prepared, and it would give me pleasure to send a few slides of them to the editor of SCIENCE-GOSSIP, who is doing such good work in circulating among us the exchangeable facts of popular science. That the leaves or hairs of the Sun-dew are endowed with contractile irritability I have doubts. In many instances I have placed them under a lens, and with a needle's point touched every part, but never succeeded in obtaining any evidence of the fact. And often in their native bogs I have found pollen-grains of the pine nestling unclasped between the sticky gland. A *dead* ant or other small insect placed carefully on the leaf in every instance failed to elicit any entomological propensity whatever. But a living insect, exposed in the same position, soon drew around it many filaments and glands, which appeared to adhere because of their sticky covering, rather than from any contractility they might possess. It would seem to be, therefore, the struggles of *living* insects endeavouring to escape that cause many glands to surround them, rather than any special contractility in the leaves or hairs. I have often obtained new plants of the Sun-dew by depositing the matured leaves on wet sand, and, after a short time, have found adventitious buds developed, which soon grew up into perfect plants. On the fruiting spikes, during and after inflorescence, I have found whorls of similar *leaf-buds* developed, which also have been followed by charming circles of new leaves; thus giving our attractive subject the appearance of one plant rising on the decaying ruins of another—beauty from decay, and life from what we call death.—Dr. J. G. Hunt, President of the Natural History Club, &c., Philadelphia, Pennsylvania, U.S.



## LIGHT-GIVING BEETLES.

WE find among Coleopters two groups, the members of which are gifted with the power of emitting at will a bright phosphorescent light. The first of these is the Lampyrid family, which supplies us with those "stars of the earth," the Glowworms. The name of worm, by the way, is not so ill bestowed as might at first sight appear; for, looking only at the creature's outward aspect, a more grubby, wormlike animal it would be difficult to imagine, with its long, flat, soft, wingless body, dark-coloured, short-legged, and slow-moving. This description, however, applies to the female only; the gentleman is a much gayer individual than his spouse, having a serviceable set of wings, with which he flits about all night, and often pays a visit to our drawing-rooms, attracted by the lighted lamp. Of illuminating power he can boast a small share only, this faculty being pretty well monopolized by the female.

In Southern Europe and in North America both sexes are furnished with wings, and both have the power of emitting light; indeed, a prettier scene cannot be witnessed than a swarm of these lovely insects (or bugs, as people call them in the United States) flickering among the branches of a tree in the darkness of the night, or dancing on the surface of a meadow, like so many fairy lamps.

The other group alluded to can boast of far more gorgeous representatives. I allude to the Elaterids, which we of this country know only by the Skipjack of our boyhood, or the Wireworm of maturer years. But under the sunny skies of Tropical America, the humble Skipjack—that long hard beetle which when placed on its back recovers its natural position by throwing a somersault in the air—has developed into the glorious Cucujo, and is provided with a couple of lamps, the wonderful beauty of which is a never-tiring theme of admiration with travellers in those regions. This beetle, technically known as *Pyrophorus noctilueus*, is huge in its proportions, being almost two inches long and "stout in proportion." Its colouring is rather sombre; the body being of a dark brown hue with an ashy down on the surface, relieved by a large round yellow spot on each side of the thorax. Although, however, Cucujo cannot boast of that splendour in its outer garments which is so common to the insects of the Tropics—especially to its near relatives the Buprestids,—nevertheless this deficiency is amply made up to it in the wonderful light which flashes from the spots on its shoulders,—a light sufficient to allow of small print being read by it, particularly if several of the insects are inclosed together in a phial. Indeed the light is utilized by the natives, who attach the insects to their head-dress, both by way of ornament, and as living torches to afford light when travelling. They are aptly named by the

Brazilians *Vaga lume* (Wander-lights); nor does Burton employ an exaggerated expression when he speaks of them as "flashing through the darkness of the trees."

Very beautiful are Southey's lines:—

"Soon did night display  
More wonders than it veiled; innumerable tribes  
From the wood covert swarmed, and darkness made  
Their beauties visible: one while they streamed  
A bright blue radiance upon flowers that closed  
Their gorgeous colours from the eye of day;  
Now motionless and dark eluded search,  
Self-shrouded, and anon starring the sky  
Rose like a shower of fire."—*Mudoc*.

Some years ago an individual of this species was accidentally transported to Paris, probably brought there in timber during its larval or pupal state, and great was the wonderment excited by it in the faubourg St. Antoine, where it first made its appearance. Such a phenomenon was of course as novel as it was unaccountable to the denizens of that quarter.

A few other beetles are believed to enjoy this singular faculty, but in a very modified degree. Burmeister, who has investigated the subject very closely, produces but four examples; viz., *Searabæus phosphoreus*, found in France in the department du Var, which distributes a phosphoric light from its abdomen; *Paussus spherocerus*, from the Coast of Guinea, is said by its discoverer, Afzelius, to emit a weak light from its curious globular hollow antennæ; *Chiroseelis bifenestrata*, or two-windowed, so named by Lamarck, from its having two oval spots on the lower surface of its abdomen, from whence a light issues; lastly, the handsome *Buprestis ocellata* of China, which has a large yellow spot on the middle of each wing-case. These spots are said, on the authority of Latreille, to be luminous.

Havre.

W. W. SPICER.

STUDY OF NATURAL HISTORY.—"For many years it has been one of my constant regrets that no schoolmaster of mine had a knowledge of natural history, so far at least as to have taught me the Grasses that grow by the wayside, and the little winged and wingless neighbours that are continually meeting me with a salutation which I cannot answer, as things are. Why didn't somebody teach me the constellations too, and make me at home in the starry heavens which are always overhead, and which I don't half know to this day? I love to prophesy that there will come a time when, not in Edinburgh only, but in all Scottish and European towns and villages, the schoolmaster will be strictly required to possess these two capabilities (neither Greek nor Latin more strict), and that no ingenuous little denizen of this universe be thenceforward debarred from his right of liberty in those two departments, and doomed to look on them as if across grated fences all his life!"—*Carlyle, in Edinburgh Courant*.



## ZOOLOGY.

**MUMMIED BEETLES.**—In the year 1835 the late Professor Audouin exhibited before the (French) Entomological Society a vase of red clay, resembling an orange in size and form, with a short neck, which had been taken from an ancient tomb at Luxor (the Egyptian Thebes). There was a slight fracture where the neck joined the body, and, on examination, the vase was found to be filled with a black lumpy matter, consisting entirely of the bodies of a small ptinoid beetle (*Gibbium Scotias*). The mass was quite compact, so that the number of beetles must have reached several thousands. How are we to explain the presence of such an enormous quantity of individuals of this species in a vase, into which they could not have themselves penetrated, because, previously to the fracture occurring, it was hermetically sealed? It is a problem which it is not easy to solve. M. Brullé, who quotes the story in his "Histoire des Coléoptères," believes without doubt that the circumstance is connected with some superstitious usage of the ancient Egyptians. We leave to archæologists the task of appraising this theory at its proper value, which, if it be well founded, will go far to settle the difficulty.—*Duponchel, "Dict. d'Hist. Nat."*

**OTTER.**—The *Manchester Guardian* mentions that a "fine otter was killed on the 21st February in a tributary stream of the river Mersey, about two miles below Stretford. It weighed 11 lb., and measured 3 ft. 3 in. from its nose to the end of its tail." Where it got its food from I am at a loss to imagine, as the locality named is not more than five miles from the heart of Manchester, and the Mersey is by no means clean at that point, having passed through the town of Stockport, a few miles higher up. Mr. Grindon, in an appendix to his "Manchester Walks and Wild Flowers" (circa 1858), catalogues the Otter as being found at Ashley and elsewhere in the Bollin every year; but I believe it is very rarely seen there now. Ashley is about nine miles from Manchester.—*G. H. H.*

**BIRDS FOR AN AVIARY.**—The time is fast approaching when we shall be again visited by some of our best songsters. It may be interesting to some of the readers of SCIENCE-GOSSIP to know what a number of beautiful song-birds might be kept in cage, yet few require more trouble and care than the goldfinch. The birds I shall now mention are all soft-billed birds: the nightingale, woodlark, blackcap, titlark, robin, whitethroat, redstart, wren, reed-sparrow, blue-tit, black-tit, &c., will all live in captivity. The nightingale should be taken as soon as he arrives, which is about the 9th of April: there is less trouble and more chance of his living and singing than if left until the time

of nesting. When first taken he will require a little live food, *e. g.*, mealworms or ants, with egg and scraped beef. The nightingale kept in a cage will often do entirely without water, subsisting upon the beef and egg; but, in an aviary, he not only drinks, but takes his bath daily. The woodlark is considered by many equal to the nightingale, yet how few we see in cage. He will soon become tame, and, if taken in October, will sing the summer through. Those taken in February sing sooner and louder, but do not keep in song so long. The woodlark is, perhaps, one of the best birds we keep in a cage, both for the little trouble in procuring him, and feeding, requiring nothing more than German paste, with a little bread and hempseed; also for the changeable and beautiful song, some of which contain thirty changes. The nightingale, blackcap, whitethroat, robin, and other warblers, will live in an aviary without any apparent restraint, singing and hopping about quite cheerfully. The most difficult of the birds mentioned to keep alive in captivity are the redstart and wren. Then we have the beautiful and truly wild warbling note of the blackcap, and fine measured note of the titlark. Perhaps it is not generally known that the titlark moults twice in a year; but such is the case. Nearly all the birds here mentioned require nothing more than the same treatment as the woodlark. Many of these birds will become so tame that they will feed from the hand. A short time ago I had a nightingale that used to follow me about. I was in the habit of giving him a mealworm two or three times a day. This friendship was established in a few months. One morning I missed the little fellow, and to my regret I found him in the owl's cage. Of course, he was dead; the owl, as usual, had taken off his head.—*Chas. J. W. Rudd.*

**"RIVULET MOTH."**—Mr. John M. Campbell, in stating that *Emmelesia affinitata* was supposed not to be a Scottish species is doubtless unaware that Mr. C. G. Barrett, the well-known lepidopterist, found this species in Perthshire several years ago, and that it is also said to have been taken in Skye. Both of these localities were recorded some years ago; but at the same time it is interesting to hear of its occurrence at Partick. From the great resemblance that *E. affinitata* has to *E. alchemillata*, which is a common species in Scotland and Ireland, it is possible that it may be often overlooked.—*F. Buchanan White, M.D. Edin., Perth.*

**SEA-HARE.**—At the meeting of the Zoological Society of London, on the 24th March last, a communication was read from Mr. Jonathan Couch, of Polperro, C.M.Z.S., describing a new species of *Aplysia*, or Sea-hare, which had recently occurred on the coast of Cornwall, and which he proposed to call *A. melanopus*.



**SNOW-BUNTING.**—In reply to Mr. Mash, in March number of *SCIENCE-GOSSIP*, I am sorry to say that I have watched in vain for the arrival of the Snow-Bunting here. Some half-dozen years since, I frequently saw large flocks of them; last winter I saw but three birds, and this winter I have not seen a single one. I think they must either be more scarce than formerly, or that they have gone to some other winter location. In the winter of 1847 or '48 they were exceedingly plentiful about here; and a very pretty sight a flock is, as the plumage varies from white to a dark colour—something similar to the skylark, only darker. I have two Buntings in confinement, and they seem to like it, for in summer they get so fat that they can hardly fly; but they make up for that in running about at nights. One of them sings during summer, and has sung very like the hedge-sparrow, but, unlike that bird, he never thinks of singing during the day, but tunes up in the evening and keeps on all through the night.—*A. P.*

**GOLDEN PLOVER.**—I can confirm the statement of "J. R." in *SCIENCE-GOSSIP* (page 95), that the Golden Plover can be decoyed by whistling. I have frequently done so; but I find that one or two birds are more easily whistled down than a flock of them. I frequently find the nest here on the moors, but I can only find two varieties, that is, the light and the dark-coloured eggs. They don't vary like the Peewit, all shades from light to dark. Can any of your readers say if they have done so—I mean found more shades than two?—*A. P.*

**SPHINX ATROPOS.**—I have a specimen of this moth which was taken last August in a steam-ship during the passage from Hamburg to Hull, and I am informed that they are so taken occasionally. The question arises, was it simply blown off the land, or did instinct impel it to undertake a distant flight in search of its favourite food? If so, the moth was probably on its way to the potato-fields on the Norfolk coast, where, I think, the larvæ were said to have abounded last autumn. I know not whether the potato is cultivated to the same extent on the North German territory, from whence the insect may be supposed to have migrated *nolens aut volens*.—*W. Smart.*

**LARGE EGG.**—Last year the dimensions of an unusually large hen's egg were chronicled in *SCIENCE-GOSSIP*. The following are the measurements of a duck's egg which was recently brought to me: length 3.575 inches; circumference at the widest part 6.525 inches; circumference round the ends 9.1 inches. In general appearance the form of the egg was somewhat elongated. It contained two yolks and weighed five ounces.—*G. H. H.*

**CAPTURE OF AN OTTER.**—A fine female otter was shot in March last, in Burgate Meadows, close to the river Avon, by Morrice, the waterkeeper of the

Marquis of Anglesea. From the appearance of the otter, it was conjectured that some young ones were close at hand, but they could not be found. This is the fifth otter destroyed by Morrice in the same place since last September.—*Salisbury Journ.*

**ENCLOSED NEST AND EGGS.**—It may be interesting to your readers to know that in a large elm, lately cut down near the lych-gate of Chislehurst church, a bird's nest containing seven eggs was found completely embedded, and having at least nine inches of solid wood grown over it, without any trace of an inlet. The eggs, which are quite perfect, are, without doubt, those of the Great Tit (*Parus major*), and are now to be seen by any one who likes to apply to Mr. Doumall, earpenter, Chislehurst Common.—*Walter Barratt.*

**CENTENINE EGGS.**—In several back numbers of *SCIENCE-GOSSIP*, are notices of wonderfully small birds' eggs. They were well known to, and described by, the illustrious physiologists Fabricius and Harvey. Fabricius says that the small eggs are called in Italy *centenina*, each being thought by the vulgar the last that will be laid, and that it comes as about the hundredth in number; whence its name. He adds, that the ova *centenina* are of two kinds, one being quite without a yolk—and this, the true centenine egg, the last that the hen will ever lay, or at least for a long while. The other centenine, though small, has a small yolk, and will not be the last that the hen will lay. Harvey mentions that these small eggs are called *centenina*; and Fabricius, that the albumen of the yolkless egg has the regular chalazæ. The late John Davy, one of the most excellent physiologists of this country, has a chapter on Centenine eggs of the domestic fowl, in his valuable "Physiological Researches," 8vo., London, 1863, p. 440.—*Q. F.*

**CHELIFERS.**—Allow me to say a word on behalf of the much-maligned chelifer, which has been described by a writer in your periodical as of a most quarrelsome and sanguinary disposition. I have kept numbers of *Chelifer caneroides* together for several months; and though I have constantly watched them, I never saw a quarrel or even an attempt at one; on the contrary, they seemed to be on the very best terms, and very polite and well-behaved. I wish also to mention a curious fact in natural history which has come under my notice, and of which I believe there have been many instances recorded. A neighbour of mine had a pair of silver pheasants, male and female; last year the male bird died, and since then the female has assumed the *complete plumage of the male*, and appears, I presume from the greater amount of plumage, to have increased in size. This bird is now to be seen at Levell's Hall, Terrington St. Clement, near Lynn.—*John Bramhall, St. John's Vicarage.*



## BOTANY.

TRICOTYLEDONOUS EMBRYOS.—I wish to put on record that I lately came across two embryos with true cotyledons. The first case was a seed of *Convolvulus major* (*Ipomœa purpurea*), which sent up in my garden three distinct, fully-formed cotyledonous leaves, forming a whorl round the plumule. The second “cropped up” (to use an Americanism) during one of my botanical lectures. Some forty boys were examining the embryo of the garden pea (*Pisum sativum*); each had his own embryo for dissection; every one agreed that he found his embryo split into two seed-leaves, except one dissentient voice, which asserted the existence of three seed-leaves. On examination, the embryo appeared perfect in other respects. I did not see any trace of a double plumule, or any other suggestion of a double embryo. Am I then to consider these cases as arising from chorisis? But then how is it that the seed-leaves of the *Convolvulus* were of the same shape as the ordinary seed-leaves of the plant, none of the three showing any marks of imperfection? Or again, does it arise from the union of two embryos? If so, these cases would bear on the possibility of “vegetable twins,” and on the probability of the *Cytisus Adami* (Darwin’s “Animals and Plants under Domestication,” vol. i. p. 391) being the result of a double embryo. On the other hand, I was unable to trace any subsequent separation into a double stem in the *Convolvulus*. Balfour says, “The appearance of three or four cotyledons in the seeds of some species of *Solanum* and in the *Haricot*, has been traced to a union of embryos, and not to a chorisis of two cotyledons.” (Class-Book, p. 308.) Can any of your readers refer me to the papers in which this evidence is recorded? I confess the appearance of the two embryos recorded above led me rather to think the plants grew from trifoliar phytons by some accidental variation, probably induced by cultivation, than to have recourse to either the theory of chorisis, or that of double embryo.—*F. E. Kitchener, M.A., Rugby.*

LICHENS are beautiful objects in their native places, on the tiles of a country cottage, where the house-leek and the stonecrops blow. The red tile often contrasts beautifully with the green and yellow lichen (*Parmelia*) growing on it; to be faithfully copied in all its pure tints by the Pre-Raphaelite painter. In our orchards we see the apple and pear trees covered with rich-coloured plants of this class, which are stolen by the gay goldfinch or chaffinch to decorate nests formed of beautiful moss, which are thus made *en suite* with the tree. This is the beautiful view of these lichens; but they feed caterpillars and larvæ, they grow where little else will grow, and form soils on inorganic substances suitable for higher plants. These lichens, like other parasites, cannot live where health and

purity exist, whether among animals, vegetables, or minerals. But disease and death are necessary to progress, as things are now constituted. The lichens do not grow in the earth, having leaves and stems in one. They have a strong resemblance to cancers (*Morbus Brightii*), if they are not to be classed together. They vary much in shape and colour. Some are bright and beautiful in hue; and we think how lovely they are, how rich their markings; but yet their shape is grotesque, and suggestive of life in death. They are as injurious to the higher vegetable world as the lower fungi are to the animal, producing sores on their substance. Healthy young trees are not nearly so subject to their attacks as the old and diseased. The trees in this case are types of man. Some fungi are bright in aspect, being adorned with orange, green, vermilion, and scarlet hues, which are not found so purely in most divisions of the vegetable kingdom. These are more easily imitated by the use of mineral colours, many of which are virulent poisons; such as Scheele’s green, orpiment (sulphuret of arsenic), chrome yellow (chromate of lead), and the scarlet periodide of mercury. These colours differ from the general tints of vegetation, being hardly ever seen covering an entire plant, except among the fungi. The hues of these lichens, which resemble those of our most corrosive colours, illustrate their injurious effect on the plants they infest.—*The Book of Nature and Man*, by C. O. Groom Napier.

[We are not prepared to admit either that “lichens are injurious to the higher vegetable world,” or “the lower fungi to the animal, producing sores on their substance.” It is often stated, but not demonstrated.—ED. S. G.]

FOXGLOVE (p. 91).—By a reference to Cockayne’s “Leechdoms” (described in another article), vol. iii. p. 327, it appears that the same plant was understood by *Foxglove* in the twelfth century as now. In the Durham Glossary, *Buglosse* = *Foxes gloue*, and in an Anglo-Saxon Vocabulary of the eleventh century, *Buglosse* = *Foxes glofa*. In the Anglo-Saxon Herbal (Cottonian MS., Vitellius, C. iii.) we have “Clyfwyrt sume man hatað foxes-clife.”—(See Wright’s Vocabularies, p. 30.) There is also in the above-named Durham Glossary another curious equivalent for *Foxes glova*, viz., *Trycnosmanicos*. In Wright’s Vocabularies we find “*Fion Camglata, foxes-glove*” (p. 140). The only form under which the plant appears in Hollyband, is “*Lcs gans nostre dame. Ladies gloves.*”—*R. T., M.A.*

FLORA OF ITALY.—Will any one kindly give in the June SCIENCE-GOSSIP the name of a book that will help towards naming a collection of Italian wild flowers, chiefly Tuscan? The inquirer will be glad to collect any rare specimens during the summer.—*E. M.*



## MICROSCOPY.

CUCKOO-PINT AND THE ELM AS MICROSCOPIC OBJECTS.—A leading feature of SCIENCE-GOSSIP is the pleasant and easy means it affords of intercommunication among naturalists of many different departments. Thus while we have from Major Holland an agreeable account of the Cuckoo-pint (*Arum maculatum*) in No. 64 of SCIENCE-GOSSIP, and numerous observations by Mr. Robert Holland and others on the Elm (*Ulmus*), none of these writers seem to be aware that these plants afford some most interesting objects for microscopic amusement and instruction. The Cuckoo-pint, besides its beautiful vascular structure, abounds throughout in most beautiful Raphides; they may be easily seen in the eorm, leaves, and berries. The Elm, on the other hand, affords excellent examples of small, but very distinct Sphæraphides, which are very fine and pretty in the testa, or seed-coat, and especially in the membrane of the fruit. Of Sphæraphides and Raphides, figures are given, with reference to Professor Gulliver's observations, at p. 92 of SCIENCE-GOSSIP, for April, 1870. It is desirable that, while describing the outer characters and the traditions of plants, we should also pay attention to the inner and intimate structure; for thus we may, as Prof. Gulliver shows, advance at once our knowledge of physiological and systematic botany, and this by a pleasing and interesting use of the microscope.—Q. F.

HAIR OF TILLANDSIA.—Among the most beautiful and interesting "common objects" for the microscope are the "stellate" hairs or scales of plants of which the Eleagnus furnishes the best



Fig. 122. Scale of *Tillandsia*,  $\times 90$ .

known example. I have, however, to notice a very remarkable form, found in a stove Epiphyte called *Tillandsia argentea*, differing entirely from Eleagnus

in having one ray of the star elongated in a very curious manner, and as I have never seen any such noticed before, I venture to append a sketch of a perfect scale, thinking it may interest some of the readers of SCIENCE-GOSSIP. Many of these scales have the candate appendage somewhat shorter, and these are found near the midrib of the leaf; those nearest the edge of the leaf being the longest, they form a fringe visible to the naked eye. The whole plant is covered with these curious hairs, giving it a very beautiful silvery appearance. Another beautiful example of the stellate hair is to be found on a tropical fruit, the Durion (*Durio zibethinus*), but the above is the only one I have found with this curious appendage.—Jno. Carpenter, 16, Ifield Road, Brompton.

POLLEN-GRAINS. — Mr. Barker's paper in the March number of SCIENCE-GOSSIP, p. 52, is a valuable contribution in favour of the value of Pollen-grains, as diagnostics between nearly allied plants, and in this point of view supports the observations of Prof. Gulliver, in the *Popular Science Review* for July, 1868. Much service to systematic botany may be expected from further researches in this direction, and the more so as systematists have so sadly neglected the importance of cell characters, both in botany and zoology. The Pollen-grains of *Ranunculus arvensis*, as Mr. Barker correctly says, are recognizable at once by their comparative largeness, from those of their species most nearly allied to that plant; but he omits to mention another and most important difference, equally characteristic, and this is that the surface of the Pollen-grain of *R. arvensis* is remarkably rough or muricated, while the Pollen-grains of the others, and related species, are comparatively smooth. Even in two such closely related plants as *Lotus corniculatus* and *L. major*, there is plainly a difference of size in the Pollen-grains, though in this case the form and surface is the same as the Pollen-grains of both plants. The whole subject is admirably fitted for interesting and instructive microscopic recreation at this season in the country.—Q. F.

CROYDON MICROSCOPICAL CLUB.—We are glad to see that a microscopical club has been inaugurated at Croydon. On the 6th of April a meeting was held in the public hall, when Henry Lee, Esq., F.L.S., F.G.S., F.R.M.S., was elected as president of the new club, supported by Dr. Bowerbank, the Rev. J. B. Reade, J. Glaisher, Esq., F.R.S., Dr. Millar, and others. The inaugural meeting was certainly a most successful one, and we hope that the society commencing under such auspices will soon satisfy the most sanguine expectations of its best friends. A better president could hardly have been found, which promises well for success. May they go on and prosper!



## NOTES AND QUERIES.

**SPECTRUM OF THE FIRE-FLY.**—The spectrum given by the light of the common fire-fly of New Hampshire is, according to Mr. C. A. Young's observations, perfectly continuous, without trace of lines either bright or dark. It extends from a little above Fraunhofer's line C in the scarlet, to about F in the blue, gradually fading out at the extremities. It is precisely this portion of the spectrum that is composed of rays which, while they more powerfully than any other affect the organs of vision, produce hardly any thermal or actinic effect. Very little, in fact, of the energy expended in the flash of the fire-fly is wasted. It is quite different with our artificial light. In an ordinary gaslight, it is proved that not more than one or two per cent. of the radiant energy consists of visible rays, the rest is either invisible heat or actinism; in other words, more than ninety-eight per cent. of the gas is wasted in producing rays that do not help in making objects visible.—*Journal of the Society of Arts.*

**PODDER** (p. 91).—I do not think that this is a misprint for *dodder*, though the similarity is rather suspicious; for Halliwell also gives "podder" as a Kentish word signifying "beans, peas, tares, or vetches, or such ware as have pods." I take it, therefore, that the word found in Hollyband's Dictionarie may very possibly refer to *Vicia hirsuta*, which may be called a "winding" plant, just as much as *Polygonum Convolvulus*. I hope some correspondent will be able to tell us that the name is not yet obsolete.—*Robert Holland.*

**PODDER.**—I venture to suggest for Mr. Britten's consideration whether the *Cuscuta Europæa*, Greater Podder, the parasitical plant called by the ancient writers *Podagra lini* (the gout of flax), goutte de lin of France, may not be the word he alludes to as the Podder.—*E. H. Watney.*

**BEE BORING.**—At page 65 of your March number one of your correspondents has communicated his observation of the interesting fact of the Bee boring a hole at the base of Fuchsia. It is seven years ago that I observed this phenomenon, and if I mistake not, I sent a notice of it to the *Field* newspaper; but although I have mentioned this fact of the Bee to numerous people, I have only met with two who had observed it. The cause of this I take to be as follows:—When the Bee is seen on any of the modern varieties of the Fuchsia, where the *corolla* (?) (in the Fuchsia, I believe, botanists regard the external covering of this flower as the *calyx*) is more accessible, they go to work as with other flowers. It is only when flowers are getting scarce, and Fuchsias remain, that you can see the Bee thus boring. When I first observed it, it was on an old-fashioned Fuchsia, with small pendulous flowers, and the only one then left in a small garden, which a lady had laid down as lawn. In Scotland I examined a long border of old Fuchsias, where I saw very large numbers of Humble Bees, but not one of the common Honey Bee. I apprehend that the structure of the Honey Bee is not favourable for working at so great a depth as is necessary in the Fuchsia, except in those varieties where the *calyx* is more expanded; whereas it may be comparatively easy for the long process of the Humble Bee. Bearing these remarks in mind, your readers will not be disappointed in failing to detect the Bee working in the manner described, since they

will not do it when there are flowers, or Fuchsias in which they can enter the *corolla*. This fact is one, in addition to multitudes of others, which suggests the necessity of some better definition of "Instinct" than that generally received.—*George Macilween, 3, Albany Courtyard.*

**SPIDERS AND LARVÆ.**—In reference to the query asked by your correspondent Mr. George Roberts, in last month's SCIENCE-GOSSIP, I think the following instance, which came under my observation last evening, will be sufficiently conclusive. I was searching for larvæ of *Noctua*, on a grassy bank after dusk, when the light from my "bull's eye" fell on a grim-looking spider in the very act of sucking out the life-blood of a young larva of (I think) *Triphæna orbona*.—*Geo. T. Porritt, Huddersfield.*

**SPIDERS AND LARVÆ.**—In the April part of SCIENCE-GOSSIP is a query with the above heading, which I can answer in the affirmative. If Mr. Roberts wishes to see a spider thoroughly puzzled, let him put a leaf-rolling caterpillar into its web; the spider (provided the larva be proportionate to its own size) seizes it fearlessly and winds it up; but as fast as he winds, so fast does the larva slip out of its bonds, until it either escapes from the web altogether or gets weakened by the repeated bites of its adversary. The larva of a *Noctua* also astonishes a spider, from the fact that it cannot be made to lie still in the web, though wrapped in ever so many grave-clothes; when the spider has given it two or three bites, however, its activity decreases, when the spider sucks its juices at pleasure. The larvæ of certain species of *Lepidoptera* and *Hymenoptera* are distasteful to spiders, as I observed in a short paper read before the Entomological Society in March, 1869.—*A. G. Britten, British Museum.*

**PARUS CRISTATUS.**—Your correspondent H. M. Labouchere (SCIENCE-GOSSIP, April, p. 95) desires information respecting the Crested Tit (*Parus cristatus*). I do not think there is any record of this bird ever having been seen in England, but Yarrell (British Birds) quotes several authorities for its appearance in Scotland. John Walcott, Esq., in the second volume of his "Synopsis of British Birds," published in 1789, says, "This bird has been lately observed in Scotland, once in a considerable flock." Dr. Latham, in the second supplementary volume to his "General Synopsis," says, "We have heard of this species being plentiful in some parts of Scotland, especially in the pine-forests, from whence I have received a specimen now in my possession." Colonel Montagu says, "It is not uncommon amongst the large tracts of pines in the north of Scotland, particularly in the forests of Glenmoor, the property of the Duke of Gordon, from whence we have seen it." In a note to the history of this species in the "British Ornithology" of Mr. Selby, it is stated, "Sir Wm. Jardine informs me that this bird has been found in some plantations not far distant from Glasgow, where it annually breeds." Thos. Macpherson Grant, Esq., of Edinburgh, says, "I possess one preserved specimen of the Crested Tit, shot by myself, and seen in considerable numbers;" and it was also observed by F. W. Bigge, Esq., in the Pass of Killiecrankie. (Yarrell's "British Birds," vol. i. p. 367.)—*N. P., 136, Stockwell Park Road.*

**BIRDS AND TOADS DEVOURING BEES.**—In the last number of SCIENCE-GOSSIP is a paper on the decrease of small birds in New Zealand, attributed



to the introduction of the British bee, which is said to sting the birds' tongues when they are seeking food in the flowers. It seems to me somewhat doubtful whether the insect would often succeed in striking so slender a mark as a small bird's tongue, and whether, if struck, much harm would be done to so horny a structure. If, as is suggested further on, the birds prey on the bees, it is easier to conceive that the swallowed stings might inflict fatal injury on the softer tissues of the bird's interior—though even then it would require many trustworthy observations to prove that a general mortality could be due to such a cause. This subject reminded me of the oft-repeated charge against Toads, that they frequent the neighbourhood of bee-hives to prey on the insects as they go in and out. I should like to know if any reader of SCIENCE-GOSSIP has seen them actually swallowing the Bees, and if it is known that they do the same without injury. A small bird would no doubt peck a bee to pieces before eating it, and in so doing might separate the sting-darts from the poison-gland, or possibly reject them, but the Toad swallows an insect whole and alive, and quite capable of using the weapons that nature has bestowed on it. Though I have long been in the habit of keeping Toads and Frogs of different species, I have never given them any Bees or other stinging Hymenoptera, fearing injury to the reptiles. One would imagine that the *appropriated* Bee would be certain to protrude its sting, and doing so could hardly fail to inflict a wound on the Toad, and I have no doubt that *Bufo* would, without hesitation, gulp down either Bee or Wasp, as he is always ready to snap at any living thing that will go into his mouth, and many that will not. There is no question but the reptile would survive an injury which would be fatal to the bird, as Toads possess an enviable strength of constitution; still, it would be interesting to know whether his Toadship enjoys perfect immunity from the effects of insect poison, or whether he suffers from taking *sauce piquante* with his meal.—George Guyon, *Ventnor, Isle of Wight*.

PENNYROYAL.—“In case a woman suddenly turn dumb, take pennyroyal, and rub to dust, wind it up in wool, lay under the woman; it will soon be well with her.”—Cockayne's *Leechdoms*, &c., vol. iii. p. 59.

“HABERGEON” (p. 94).—My view as to this being the diminutive of *hawberk* is, I see, held in the exhaustive note to “Promptorium Parvulorum,” tom. i. p. 220, which commences: “Habergeon appears properly to be a diminutive of hawberk, although here (in the text of Prompt. Parv.) given as synonymous,” &c.—R. T., M.A.

“PODDER” (p. 91).—Mr. Halliwell quotes Hollyband quite correctly. His words are “Agoure de lin, *m*, a weed called Podder, winding about hempe or other like” (ed. 1593). The next work I quote is Cotgrave's French-English Dictionary (ed. 1650):—“Agoure de lin (the weed), Dodder;” “Dodder, Dodder-grasse, agoure de lin, pialet, goutte de lin, Podagre de lin.” Bailey (1736) gives: “Podagra lini (Botany), the herb Dodder.” Bescherelle's Dictionnaire National has—

“Agourre }  
Angoure } de lin = Angina lini,  
Engoure }

Nom ancien donné suivant Dalechamp à la grande cuscute, parce qu'elle fait périr la tige de lin quand elle s'y attache—on la nomme aussi goutte de lin.” Under *Tigue* (see Gerard) = Teigne, he has “nom

vulgaire, de la cuscute;” and lastly, Littré, French Dictionary (in course of publication), makes “Goutte de lin = cuscute = *Cuscuta Europæa*, plante parasite dont la tige s'attache aux herbes voisines, y prend sa nourriture au moyen de suçons et étouffe les végétaux envahis.” *Dodder* is the old equivalent of *Cuscuta Europæa*, as may be seen in Cockayne's “Leechdoms,” &c., vol. iii. p. 322, and Wright's Vocabularies, p. 140 (cuscute = dodder; there is an error in the text, as printed by Mr. Wright, for a reference to the original MS. shows that the word is *Cuscute*, not *Euscute*). I have nowhere met with *Podder*, though it might easily have come from *Podagra*.—R. T., M.A.

HAREBELLE.—In a Nominale of the fifteenth century, this is given as the equivalent of *Bursa pastaris* (sic).—R. T., M.A.

REUNION OF SEVERED INSECTS.—In Burton's “Lectures on Entomology,” p. 30, I find the following statement: “It may not be out of place to relate a curious instance of the hardihood (if I may so call it) of the Wasp. One of these insects was crawling up a window, when a lady seized it with a pair of scissors, with the intention of killing it, but by accident cut it in two; the Wasp was no longer thought of for some time, but the lady, happening by chance to look at it, thought the two parts had approached nearer each other; it was then watched, and after being separated for three or four hours they gradually joined; it then rested for a few minutes, and the parts appeared to be as firmly fixed as before the accident had happened; it then crawled up the window and flew away. This may be relied on as a fact.” And again, on p. 41, speaking of ants, he says, “A very curious circumstance then occurred, which if I had not seen with my own eyes, I certainly should not have believed. One of the ants had been accidentally cut in two, and I saw the legs and head running about the mould evidently in search of its body. In about two hours it had been successful, for I saw it joining its body to its head and legs, and it then walked about with as much activity as the rest.” I should like to hear the experience of other entomologists on this subject, as I can hardly imagine such a miracle possible.—W. Luff.

RUE IN NOSEGAYS.—As Mr. Britten, page 67 of the March number of SCIENCE-GOSSIP, seems to doubt my statement that the Rue was ever placed in nosegays, I give him my authority. Shakspeare, in “All's Well that Ends Well,” makes the clown say of the countess, “She was the sweet-marjoram of the salad, or, rather the *herb of grace*.” Now the Rue was known as the herb of grace, and Lafeu answers, “They are not salad herbs, you knave, they are *nose-herbs*.”—H. E. Watney.

FOXGLOVE (p. 91).—This name must have been applied on the *lucus a non* principle, that foxes don't wear gloves; “a cat in mittens,” says the proverb, “catches no mice;” and a farmer would think foxes nicely handcuffed in gloves. But perhaps it may have been supposed that the fairy folk lent *digitalis* flowers to the Fox, to soften his velvety tread when on a marauding expedition, as burglars wear list slippers.—A. H. Gent.

BEE BOOK.—A new edition of Dr. Bevan's Book on the Honey Bee, its natural history, physiology, and management, revised and enlarged, with illustrations by W. A. Mann, is announced as in preparation. Without doubt it is just the sort of book that some of our readers want.



THE FROG.—Perhaps the following may be an answer to the inquiry made in the March number of SCIENCE-GOSSIP (p. 71). The place from which I date is in lat.  $55^{\circ} 36' N.$ , long.  $4^{\circ} 30' W.$ , and within, as the crow flies, six or seven miles of the sea. So far as my observations go, the appearance of Frogs and the deposition of their spawn depends on the clemency or inclemency of the season. The usual time to get frog-spawn here is in the beginning of March. Many years ago, my attention was drawn to frogs spawning early in spring, by seeing on the 1st of March, a cake of spawn in a pool which was covered with ice at least half an inch in thickness: the weather at the time was unusually fine. Since that time I have watched for the earliest spawn, and found, as a rule, that it was to be got on the first or second week of March, but earlier if the season were exceptionally mild. In SCIENCE-GOSSIP for June, 1868 (p. 141), it will be seen that spawn was got in the last week of Feb., 1866; on the 23rd of Feb., 1867; on the 27th of Feb., 1868; and I think about the same time in 1869, but I have not the date. This spring the first I got was on the 15th of March, and it had the appearance of being very recently emitted. The weather then, till within a day or two of the 15th, was severely cold, dry, and frosty. We have often a few days of mild spring-like weather about the middle or towards the end of February, when the frogs emerge from their winter quarters. If such mild weather do not happen, they are detained, and thus, I believe, the advance or retardation of spawning is according to the temperature of the season. I have no register for this place; but on referring to that kept at the observatory of the University of Glasgow, which is about 20 miles N.E. of this, the mean temperature of the months of Jan. and Feb. for the last nine years is as follows:—

	Jan.	Feb.
1862 .....	38.2 .....	39.9
1863 .....	37.4 .....	41
1864 .....	36 .....	32.9
1865 .....	35.4 .....	33.1
1866 .....	40 .....	36.9
1867 .....	31.9 .....	41.4
1868 .....	38.1 .....	42.8
1869 .....	41.5 .....	43.5
1870 .....	36.2 .....	35.6

The average for March is not yet published. I have no doubt, when published, it will show it to be low (unless what is to come of the month be exceptionally mild), and prove that frogs, in their family arrangements, are entirely under the influence of the temperature of the season. To-day, March 24, on examining the spawn got on the 15th, and which has been kept out of doors, under a verandah looking S.E., I find it has made very little progress in its development, the yolks of the ova retaining their sphericity, while in a few eggs from the same mass of spawn, which were put into a small beaker and kept in a room in which there is a fire during the day, the embryo is lengthened out considerably and the budding of the branchiæ, &c., distinctly seen; thus proving that the rapidity of growth *in ovo* is hastened or hindered by heat or cold.—J. M. A.

VELVERD.—A friend at Calne, in Wiltshire, with whom I have communicated, informs me that the above is a local name for the Fieldfare. It is perhaps better known as the Velt, a rustic pronunciation of felt or Pigeon-felt, the name by which it is known in this county and Berks. The Woodpecker is the Heckle or Wood-heckle in this locality.—H. S., Henley-on-Thames.

DABCHICK.—In Macgillivray's "Manual of British Birds," genus 138, I find the following passage: "The Dabchick floats, swims, dives, and, as I have ascertained from observation, *flies under water* with astonishing ease and activity." As I never before heard of a bird *flying under water*, I should very much like to know if such really is the case, or if it is merely a movement of the wings when diving, mistaken for flying. Perhaps some of your correspondents have had both time and opportunity for watching the movements of this most interesting bird, and if it does *fly under water* they doubtless will have noted it.—S. W., York.

YOPPINGAL.—In the number of SCIENCE-GOSSIP for April, Mr. R. H. Nisbett Browne inquires what bird it is that is known in Wiltshire as the "Velverd." It is the Fieldfare (*Turdus pilaris*), and I believe is scarcely known by any other name. The other local name is slightly misspelt; it should have been Yoppingal, by which name the Woodpecker is well known, and is so called on account of the loud calling sound it makes as it flies; yopping being a provincialism for shouting or loud noisy talking. This word (yopping) is not confined to Wilts, but is occasionally used in Hunts and parts about Peterborough.—J. B. Bodman, Castes, Peterborough.

A CANNIBAL.—A few years ago I had in my breeding-cage some larvæ of *Chelonia cava*, which had been for several hours without food. On looking into my cage I caught one of them in the act of devouring a chrysalis of one of his brethren, which was lying with some others in one of the trays. I am aware that these larvæ are exceedingly voracious, but I never before knew that they were cannibals.—R. Laddiman, St. Augustine's, Norwich.

BEEES.—I should be much obliged if any contributor will tell me the cause of the following, for though an old man I am but a young apiarian. I have four hives under a covering; the two centre are old stock. Now this month (April) I find one of these old hives deserted, and a quantity of what appears to me white wax. It tastes bitter and sweet. I perceive that there has been great destruction of life at the mouth of this hive and the next, last year's swarm. This now empty hive was all life and animation a few weeks back, but now it is a deserted mansion. I ought to mention that all my hives are the old-fashioned straw hives, and that I did not feed any of them through the winter. The others are very busy bringing home pollen.—J. L. P.

EMBRYO OYSTERS.—Can any of your correspondents furnish me with a formula for cleaning embryo oyster-shells? In spite of any directions I have seen, I am unable to entirely get rid of a small quantity of flocculent matter which clings to them most persistently, and is just sufficient to destroy the beauty of the mounted slide.—W. J. B.

SPIRAL VESSELS.—In Quekett's "Histology," vol. i. p. 14, article Fibre, alluding to the immense number of spiral vessels obtainable from the lily tribe, and also from one species of Mediterranean squill, he remarks: "These fibres are obtained in such abundance from some plants that they are collected, bound into bundles, and used as a kind of slow match for lighting pipes and cigars." Not having seen anything answering to this description, shall be glad of any information on the point.—W. J. B.



## NOTICES TO CORRESPONDENTS.

ALL communications relative to advertisements, post-office orders, and orders for the supply of this Journal, should be addressed to the PUBLISHER. All contributions, books, and pamphlets for the EDITOR should be sent to 192, Piccadilly, London, W. To avoid disappointment, contributions should not be received later than the 15th of each month. *No notice whatever can be taken of communications which do not contain the name and address of the writer*, not necessarily for publication, if desired to be withheld. We do not undertake to answer any queries not specially connected with Natural History, in accordance with our acceptance of that term; nor can we answer queries which might be solved by the correspondent by an appeal to any elementary book on the subject. We are always prepared to accept queries of a critical nature, and to publish the replies, provided *some* of our readers, besides the querist, are likely to be interested in them. We do not undertake to return rejected manuscripts unless sufficient stamps are enclosed to cover the return postage. Neither can we promise to refer to or return any manuscript after one month from the date of its receipt. All microscopical drawings intended for publication should have annexed thereto the powers employed, or the extent of enlargement, indicated in diameters (thus:  $\times 320$  diameters). Communications intended for publication should be written on one side of the paper only, and all scientific names, and names of places and individuals, should be as legible as possible. Wherever scientific names or technicalities are employed, it is hoped that the common names will accompany them. Lists or tables are inadmissible under any circumstances. Those of the popular names of British plants and animals are retained and registered for publication when sufficiently complete for that purpose, in whatever form may then be decided upon. ADDRESS, No. 192, PICCADILLY, LONDON, W.

J. W. G.—We know nothing of the author's intentions—but the first volume of an "Elements of Zoology" is just published by Mr. Hardwicke, 192, Piccadilly.

F. I. W.—No. 1. *Polycystis* (or *Urocystis*) *pompholygodes*. 2. Chiefly a form of diseased tissue, at one time considered a fungus, under the name of *Erineum*. 3. The leaf of a Boraginous plant, with ordinary glandular structure.

H. F. P.—No. 4. *Callopisma Vitellinellum*. Mudd. 5. *Lecanora pullescens*, *V. parella*, L. 7. Three plants mixed.—W. C. C.

W. E. H.—Egg-eases of the Cockroach (*Blatta orientalis*).

E. M. H.—Please to read the notice at the head of "Exchanges."

G. H. H.—We have no doubt that Mr. Britten is well enough acquainted with the "Dodder," and made his inquiry about "Podder" with a very good reason. No magnifying power is given to D'Orbigny's figures.

N. P.—Cocoons of *Trichiosoma leucorum*—one of the family *Tenthredinidæ*.—F. M.

E. M. H.—No. 1. Received in a finely comminuted state; probably not a lichen when intact. 2. Immature; possibly *Bilimbia sphæroides*, Sommf.—W. C. C.

MOSES.—Replies in our next. We must caution some of our correspondents against systematically sending us, nearly every month, specimens to name. This we do not regard as our mission. We may render service by occasionally naming an obscure species, but we cannot consider that we render any service to those who are too idle to study for themselves, by naming common species for them month after month. Unless this is amended, we must decline naming specimens at all.

## EXCHANGES.

NOTICE.—Only one "Exchange" can be inserted at a time by the same individual. The maximum length (except for correspondents not residing in Great Britain) is *three* lines. Only objects of Natural History, permitted. Notices must be legibly written, *in full*, as intended to be inserted.

FOR Seales of Roach, Dace, and Goldfishes, send stamped directed envelope, or any other Fish Seales, to J. Needham, jun., 27, Approach Road, Victoria Park.

EMPEROR MOTH PUPA, in exchange, or on payment of postage.—E. Harwood, Foster Clough, near Mytholmroyd, Yorks.

CEYLON FERNS (dried) in exchange for European or South American Species.—T. W. Nayler Beckett, Dyffryn Dulas, Abergyle.

WANTED, Genuine British Eggs of Chough, many rare Eggs to offer.—J. W. Lloyd, Kington, Herefordshire.

WANTED, in exchange or otherwise, Valves of *Aulæodiscus Kittoni*, with more than four rays, or processes, and *A. Comberi*, with more than three ducts.—Rev. J. Bramhall, St. John's Vicarage, Lynn, Norfolk.

LICHENS.—*Sticta crocata* and other southern species for Highland rare species.—E. M. Holmes, 2, Arundel Crescent, Plymouth.

## BOOKS RECEIVED.

"Scientific Opinion." Part XVII. April, 1870.

"Land and Water." Nos. 218, 219, 220.

"Monthly Microscopical Journal." No. 16. April, 1870.

"Canadian Entomologist." March, 1870.

"Canadian Naturalist." December, 1869.

"The Book of Nature and the Book of Man." By Charles O. Groom Napier, F.G.S., &c. London: J. C. Hotten.

"The World of the Sea." Translated and Enlarged by the Rev. H. Martyn Hart, M.A., from "Le Monde de la Mer," By W. Moquin-Tandon. London: Cassell, Petter, & Galpin.

"The Dental Register." February, 1870. Cincinnati: Wrightson & Co.

"Le Naturaliste Canadien." March, 1870.

"Darwinism: The Noachian Flood." A Lecture by Thomas R. R. Stebbing, M.A. London: Macmillan & Co.

"Simple Questions with Easy Answers on Kindness to Animals." By Rev. J. Pemberton Bartlett. Southampton: Paul & Son.

"The Animal World." No. 7. April, 1870.

"The Popular Science Review." April, 1870. London: Robert Hardwicke.

"The Gardeners' Magazine." Part LII. April, 1870.

"A Manual of Zoology, for the Use of Students." By Henry Alleyne Nicholson, M.D., D.Sc., &c. Vol. I. Invertebrate Animals. London: R. Hardwicke.

"The American Entomologist." March, 1870.

"Good Health," a Journal of Physical and Mental Culture. Nos. 8, 9, 10. Boston, U.S.: A. Moore.

"The American Naturalist." Vol. IV. No. 2. April, 1870.

"Announcement of the Forthcoming Series of Annual International Exhibitions."

"Catalogue of Collections and Specimens of Minerals, Fossils," &c. for sale by J. R. Gregory, 15, Russell Street, W.C.

"Transactions of the Norfolk and Norwich Naturalists' Society, 1869-70." Norwich: Fletcher & Son.

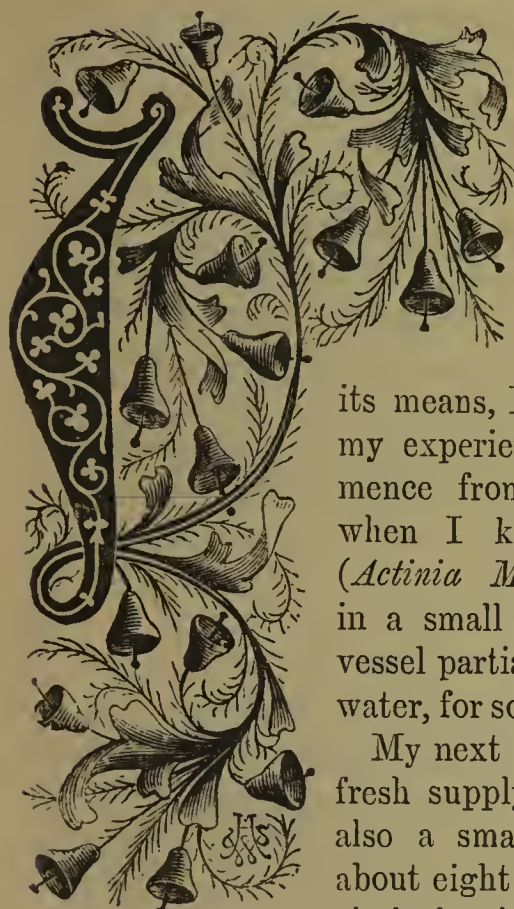
"Zymotechnic News." Vol. 1. No. 2. No. 202, South Fourth Street, St. Louis, Mo., U.S.

COMMUNICATIONS RECEIVED.—A. P.—R. H.—S. W.—G. M.—F. J. W.—G. T. P.—A. G. B.—J. G. H.—H. E. W.—J. N.—H. C. L.—F. E. K.—W. H.—W. A. M.—J. W. G.—W. L.—M. P.—A. H.—S. S.—R. T., M.A.—N. P.—G. G.—G. S. T.—O. M.—A. G.—T. W. N. B.—H. S.—J. W. L.—J. C.—S. A. S.—G. H. H.—R. L.—A. W. L.—W. B.—M. M.—W. H. P.—G. C.—E. M. H. (nothing inclosed)—E. C. J.—W. J. B.—J. B. B.—W. B.—A. J.—J. B.—J. R.—G. G.—J. C. D.—W. S.—W. C.—E. W.—J. L. P.—J. H.—C. E. D.—W. B. F.—O. M.—A. H.—E. M.





## MARINE AQUARIUM.



N order to assist those who are willing to possess a cheap marine aquarium, and to cultivate the study of marine zoology by

its means, I purpose to relate my experiences. They commence from the year 1867, when I kept an anemone (*Actinia Mesembryanthemum*) in a small shallow porcelain vessel partially filled with sea-water, for some length of time.

My next step was to buy a fresh supply of sea-water, as also a small dessert-dish of about eight inches in length, six inches in breadth, and two

inches in height; and to this the anemone was transferred, together with a piece of the seaweed (*Cladophora arcta*). An improvement was now suggested to me, viz., that of syringing the water, which improvement I immediately adopted, and syringed it daily by means of a small glass syringe. Shortly afterwards I noticed a quantity of very young sandhoppers crawling about among the tufts of the *Cladophora*, which I immediately removed and conveyed to a separate receptacle. The sandhoppers were fed occasionally with small fragments of meat, of which they seemed very fond, and ultimately grew to a fine size, some of them to nearly an inch in length.

In the year 1868 I obtained a glazed earthenware baking-dish of nearly two feet in length, sixteen inches in breadth, and three inches in height, and capable of holding nearly a gallon of water. To this I transferred my live stock, and now took a trip to the sea-side, from whence I obtained a few more anemones, as also a limpet, which very soon attached itself to the sides of my dish, and made itself quite at home.

No. 66.

Some wooden wedges were procured and pushed underneath the dish, giving to it an inclination, and by this means the water became deeper gradually; the anemones chose their depths.

The limpet very often crawled so far above the water-mark that it was left quite dry, in which state it was inactive, but immediately became quite lively when a stream of sea-water from the syringe was made to play upon it. There was a considerable amount of syringing required to keep this aquarium in good order. One or two mussels were now introduced, and fastened themselves by means of their byssus, and seemed to thrive very well, when, from some slight cause or other, one of them died; the rest immediately followed. The water consequently became thick and turbid, and had a very peculiar odour. The few stones which I had introduced became of an inky colour, and when syringed the water gave out an odour of sulphuretted hydrogen. The remedial process was the following:—Everything had to be taken out in the first place; in the second place the dish was placed for a couple of hours in the open air, after which time the odour disappeared.

I kept this aquarium in good order for six months in the year 1868, out of which six the limpet lived for two months.

In June 1868 I bought a propagating-glass of a foot in diameter and a foot in depth, capable of holding two gallons of water. A piece of slate was cut into a circular form and placed therein at an angle of forty-five degrees, making an inclined plane, upon which stones, etc., could be arranged. The light from the front of the aquarium was stopped off by thick dark paper, so that only diagonal rays of light entered it. The object of this proceeding was to prevent that excessive growth of confervæ which is so annoying, and to keep the water at the back of the slate cool and dark. The room in which this aquarium stood was much exposed to the heat of the sun, and I remember one afternoon looking at the thermometer and finding that it registered ninety degrees Fahrenheit. The method of aëration was as follows:—Firstly, a large

G



box was stood up by the side of the aquarium, reaching considerably higher than it. Secondly, a gallon of sea-water was made to run off daily by means of a siphon into a gallon bottle, which, when full, was lifted up into the box, and was emptied into the aquarium again, gradually, by means of a siphon armed with a small glass jet, from which the water ran in a small stream for some time.

The advantages of this aquarium were :—

Firstly and principally, the water was better aerated, and with less trouble.

Secondly, there was a dark chamber which kept a great portion of the water cool and fresh.

Thirdly, objects could be conveniently magnified through the glass.

Fourthly, the view from the front of the aquarium was very good.

This aquarium contained a dozen specimens of *Actinia Mesembryanthemum*, two ascidians, two hermit crabs, two shrimps, one blenny.

Not long afterwards I obtained a good many hermit crabs, and bought a separate glass globe for them. They afforded me much amusement, and would contest desperately for a piece of meat. On throwing a fragment near one of them, it would at first appear unconscious of the presence of such a luscious morsel, which it would, however, not be long in discovering, when it would dash frantically at it, and having secured it with the large claw, would then pick tiny pieces out of it with the smaller one. It is a curious thing that a hermit crab having left its shell seems to recognize it again by some means, for I used often to drive one of them out of its shell to show the ludicrous manner of getting into it again: this was done by gently tapping upon it, when, after a series of taps, it ultimately left it in a jerky fashion. Its manner of creeping in again is as follows:—On approaching it, it feels it all over with its claws, and being satisfied with its identity, throws it over and gets into it backwards, then with a flourish of its legs the shell rolls over, and the crab is again on its legs.

My present aquarium, which will form the principal subject in this paper, was established in the spring of 1869. It is a propagating-glass of twenty inches in diameter, and about thirty inches in height, capable of holding from eighteen to twenty gallons. The portion which has the knob rests upon a basket filled with fine mould, above which is a strip of blanket to take off the strain. For the sake of better aëration, only six gallons of sea-water are kept in it. Fitting the bottom of the aquarium and lying parallel with it is a piece of circular slate. This piece of slate has near its centre two holes bored into it, and into these two little wooden plugs are driven, which project upwards. Resting upon these plugs, and inclined towards the back of the aquarium, is another piece of slate, to which an oyster-shell has been cemented with hot gutta-

percha, forming a capital ledge for the suspension of seaweeds, zoophytes, etc. The light is stopped off in this aquarium in the same manner as in the former one, and the latter piece of slate forms a good dark chamber.

It so happened that in the room which I had chosen for this aquarium there was a cupboard near the window, and high up in the wall. I took advantage of this fact and nailed some thin gutta-percha tubing from this cupboard along the wall to the aquarium, over which it hung at a distance of a few inches, and was provided with a small glass jet, which came to a fine point, and which had a small orifice. This is the arrangement for the aëration of the water; for drawing it off there is a separate gutta-percha tube, extending so far into the water as just to draw off a gallon of water, and when I wish to aërate that remaining in the aquarium, I place a gallon bottle at this latter tube, and no sooner is it full, than I lift it up to the cupboard, which is fully three feet higher than the aquarium, and place that portion of the tube which is therein into the bottle, and gently suck that end overhanging the aquarium, when the water soon commences running from the jet in a fine stream, and with great force driving a shower of minute air-bubbles to the depths.

The water is tested daily by means of a small specific-gravity test, and according to the amount of its evaporation so much fresh water is added.

This marine aquarium contains—a little shore crab (*Carcinus Mænas*); a good many marine cyclops; a young rock limpet (*Patella vulgaris*); some young mussels; a dog-winkle (*Purpura*); a fine colony of *Halodactylus*, upon a piece of wrack (*Fucus serratus*); *Bowerbankia imbricata*; *Pedicellina Belgica* (large specimens); *Serpula contortuplicata*; *Spirorbis communis*; colonies of *Spio seticornis*; eighteen anemones (principally *Mesembryanthemum*); two pieces of deep-sea *Tubularia gracilis*, upon which fine tentaculated heads have developed; a fine colony of *Campanularia geniculata*. I may mention that I have kept the above-mentioned creatures for upwards of six months, and some of them for a longer period, in the greatest health.

The expenses of this aquarium, with the necessary paraphernalia, would be as follows :—

	s.	d.
The propagating-glass costs .. ..	7	0
The gutta-percha tubing costs 3d. per foot, say three yards, at 9d. .. ..	2	3
The specific-gravity test costs .. ..	1	0
The sea-water, 6d. per gallon, say six gallons .. .. ..	3	0

The total cost is .. .. 13 3

So that for less than fourteen shillings I have an unlimited amount of intellectual amusement and



instruction. In dismissing the subject, I would caution those who might be disposed to try such an aquarium to guard against the evil of crowding it with too many living creatures at once, for if the water once gets tainted by the death of one of them, the rest are sure to follow; and one would have to stock the aquarium again, after the water had recovered its purity, which it would do after a little time, if aerated as mine is at present.

OSCAR MELTZER,

*Millbrook Cottage, Loughborough Road, Brixton.*

### THE NATURAL CHINESE MUMMY.

A DRIED specimen of humanity was found by a Chinaman on 21st February, in an abandoned shaft situated at Donkey Hill, Campbell's Creek. It seems the unfortunate finder descended the shaft (which was about 35 feet deep) to seek for washing-stuff, and that on lighting his candle in the drive, the first object which met his view was the horrible-looking remains of another Chinaman. His exit from the shaft was somewhat quicker than his entry, as may be supposed, and it was some two days before he communicated with the police. The Chinese have a superstitious horror of touching a dead body, it appears; and accordingly no one of the race has laid any claim to these remains, or has acknowledged any acquaintance with the deceased.

First, to describe the mummy. It is evidently that of a Chinaman, probably about 30 years of age. The body is drawn up, the knees to the chest, the hand contorted as with pain, and the face twisted into a most horrible expression of torture. The mouth is open, the teeth perfect; but one must believe, from the wrenched, agonized look of the face, that the unhappy creature died with a shriek of mortal agony. The eyes have disappeared, the orbits being partially filled up with dried animal matter; the nose is also imperfect, and portions of the lips have apparently been eaten away. The hair on the front part of the head is entire, and the queue is also perfect, but was separated from the back part of the head in lifting the remains from the shaft. The body as it is weighs about 12½ lb. The skin looks like discoloured parchment, and yields to the touch in the same way as leather does, and only to that extent. The nails are perfect, and apparently were rather long, as if the unfortunate had not been a hardworking Chinaman. The fingers are covered with a sort of white efflorescence, apparently *lime*, and the same is on portions of the legs. The word efflorescence is used advisedly, as the chalky formation does not look like a deposit, but rather an outgrowth from the remains. It is a hard substance, but has all the appearance of a fungoid growth. It appears, however, that this may be a deposit of falling clay from the roof of the drive, as some of the limbs were

partly buried. No clothes are on the body, but some were found in the drive.

The remains were identified by some Europeans, as those of a Chinaman who had been missed for some three years. It was believed by some that he was partially insane during life, and that, falling ill, he had retired to the drive in the shaft where his body was found, and that he had there lain down to die. It is concluded that he starved himself to death; but the conclusion is possibly arrived at without thoroughly sufficient premises.

The shaft is situate at Donkey or Doctor's Hill, about half a mile from the main road from Castle-maine to Guildford, on the top of a moderately high hill. It is exactly 35 feet in depth, and is sunk through a gravelly deposit of about 25 feet; then through what diggers call cement, a sort of conglomerate of iron-stone, excessively hard. Underneath this is a stratum of the stuff called pipe-clay, but which in some respects resembles kaolin. In this the drive was made in which the remains were discovered. A sample of this earth is enclosed.

The temperature of the drive at the time of examination, a warm day, was nearly the same as that of an ordinary cellar, about 60° Fahrenheit. The thermometer in the shade on the surface of the earth stood at 68°. There was no draught through the drive, nor any perceptible odour: the air seemed pure and dry. The earth was also extremely dry and powdery, and fell easily at a slight touch. Not the slightest appearance of any dampness was to be seen.

The Chinaman had evidently prepared the place for his occupation, as there was a quantity of gum-leaves formed into a rough sort of bed; and he had as evidently prepared himself, either for sleep or death; since his clothes were removed, with the exception of the shirt, and were lying beside the deceased. The shirt, which was on the body, was reduced almost to tinder, and crumbled away in the course of removing the remains. The trousers were comparatively perfect, but the boots were destroyed, the uppers having come away from the soles.

The reason how or why the skin should be preserved so entire is still difficult to understand; for, on descending the shaft, some flies were found there. The mummy would appear to be outwardly preserved, only the skin having apparently been partially tanned, and the remains gradually undergoing the process of petrification. It has not been decided whether the Melbourne Museum will receive the mummy as a curiosity or not at this date.

A photograph of the mummy is enclosed to give a better idea of the position and the degree of preservation.

E. WHEELER.

[Castlemaine is in Victoria, about 78 miles from Melbourne. The circumstance above narrated occurred at the diggings among the deserted shafts and it is believed that several Chinamen have taken up their abodes amongst them.]



## MORE ABOUT THE PUSS-MOTH.

A CONSIDERABLE amount of interest attaches itself to the caterpillar of this species, from the fact that its structure is singular, its habits peculiar, and that its history goes back further than most of our British caterpillars, since a pretty accurate description of it is given by that worthy old angler Isaak Walton, who had often diverted himself, while "waiting for a nibble," by watching these creatures feeding or reposing on the willow-leaves near the margin of the stream. Besides the species before us (*Dicranura Vinula*), it should be noted that we have three other species occurring in these islands, with similar appendages at the extremity of the body, and belonging to the same genus. These are popularly known as the "Kittens," being less in size. One of these is of great rarity; the others are not so plentiful as the almost ubiquitous "Puss." The caterpillar of the species designated *D. Furcula*, though only half the size of its relative, is still more beautifully marked. The caterpillar of the Puss-moth, however, is liable to vary, individuals being found almost every year in the suburbs of London, and elsewhere, which have the ground colour lighter through the earlier stages, and the disposition of the markings also varies slightly; no corresponding difference showing itself in the moth. One of the oddest things observable in the appearance of the young caterpillar is the adornment on the head, in the form of two little processes, like ears in miniature; and when the caterpillar is at rest, stretched at full length, as it will sometimes place itself, with the anal horns closed, and extended horizontally, it really does look like a Lilliputian cat or kitten. Afterwards these points disappear, but two black spots remain to mark their former position. In an ordinary condition of the season, during the caterpillar life of the species,—that is, when the heat is not excessive, nor the temperature much below the average,—the time passed *in transitu* from egg to pupa is about seven weeks. There is only one annual brood, yet caterpillars may be found from June to September; and this is due to the circumstance, that even in the same locality a succession of moths will appear, some emerging early in May, others perhaps not till July: hence from these are produced caterpillars of differing ages; and the egg and full-grown caterpillar are often seen at the same time. The number of changes of skin is four, and on the occasion of each of these, the caterpillar spins a silken pad, to secure its hold of the leaf or twig during the four or five days it has to remain without eating. Also it will occasionally, in windy weather, form a similar tracery of silk, to prevent itself from being carried away by a gust.

How far the inner horns or tentacula are really of service to the Puss caterpillar for driving off parasitic enemies, is a doubtful point. That it will endeavour to direct them towards any part of the body which

is touched or threatened, may be easily seen, yet they are often protended by the caterpillar when no danger impends; and we find that a very large proportion of the caterpillars found at large, when nearly adult, have been attacked by parasitic enemies, especially belonging to the Hymenoptera. Often will these permit the caterpillar actually to form its cocoon, and then emerging, they construct theirs within it, as shown by Rennie. The caterpillar has a power of ejecting from a slit beneath the chin, about three lines in length in the mature individual, a sharp liquid, which slightly excoriates the skin. When taken from its native tree and placed in confinement, it loses this ability, though the caterpillar, if irritated, may be observed to move this slit, and make apparent attempts at the ejection.

The cocoon, as noticed by Mr. Spicer, is formed of any material handy to the caterpillar: fragments of paper will be used, if wood is not supplied; and I have heard of one constructed of potato peelings! When a full-grown caterpillar is placed under a saucer, and covered with a glass tumbler, it may be made to form a cocoon entirely of the gummy secretion, which is usually combined with other materials. In this case it is thin and transparent, resembling horn in texture when dried.

JOHN R. S. CLIFFORD.

## THE LOTUS: ITS HISTORY AND TRADITIONS.

FAR from pretending to have exhausted this very interesting subject, I venture to submit the following notes to your readers, as an instalment only.

The application of the word Lotus to two different and distinct objects has tended, much to complicate the task of identification.

1. There is the Lotus of the Nile, an aquatic plant, which has its counterpart in the Lotus of the Ganges.

2. The edible Lotus, which furnished the food of the Lotophagi.

1. We find the Lotus, in varied forms, freely used in Egyptian ornamentation, in inscriptions, and in hieroglyphics, as representing the polypetalous Hypogynæ, or plants of the Lily kind; among these, the *Nymphæaceæ*, or Water-lilies, are the *Nymphæa Lotus*, the virgin lily of Moore's "Lalla Rookh,"\* the *white* Lotus of the Nile; and also *N. cærulea*, the *blue* Lotus of the Nile.

But it is supposed that the true sacred Lotus of

\* "Egypt's palmy groves.

\* \* \* \* \*

Those virgin lilies, all the night,  
Bathing their beauties in the lake."

*Paradise and the Peri.*



Egyptian antiquity belongs to the *Nelumbiaceæ*, or Water-bean family, indicated as *Nelumbium speciosum*; a point that may be considered definitely settled from the fact that it is also called *κναμος*, the Greek word for *bean*. It is said not now to be found in the Nile, but is very abundant elsewhere, and furnishes wicks for the lamps of Hindoo temples at festival time. Water trickles from this plant without penetrating it, presenting an appearance "like dewdrops on a lion's mane:" this circumstance has been improved into an Eastern proverb, to the effect that a good man resists temptation, as the lotus-leaf resists water. The fruit of *N. speciosum* is said to have been the Egyptian bean, which the disciples of Pythagoras were forbidden to eat. Root and fruit are now, however, still eaten in India.

The following are representations of flowers and plants from Egyptian antiquities, the latter of



Fig. 123.

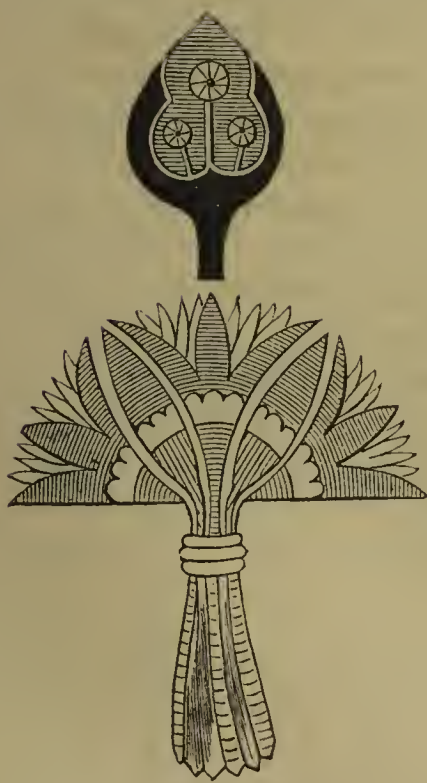


Fig. 124.

which presents us with unmistakable evidence of having been the origin of an alphabetical symbol.


Let any one compare the upward outline of this figure with  the hieroglyphical equivalent of *sh*,



Fig. 125.

and *ש*, the Hebrew *shin*. This particular letter has been copied in the Phœnician and Cuneiform alphabets; it originated the old Greek *sigma*, and may be traced in Zend, Arabic, Coptic, and through upwards of twenty dialects, into the Russian and Maltese of the present day; uniting, in this one particular, about half a dozen different families of speech.

2. The Lotus was sacred to Isis, the Egyptian goddess of fecundity; and as it grew spontaneously on Egyptian soil, when irrigated by the Nile, it may represent life, growth,—what we call vegetation.

With this idea before us, we shall not go far wrong if we assume that the Greek word *Lotophagi* represents a people who, in modern parlance, would be called *vegetarians*.

The true edible Lotus of antiquity belongs to the *Rhamnaceæ*, or Buckthorn family. Among these we have the jujube-trees (*Zizyphus Jujuba*, *Z. Lotus*, *Z. vulgaris*), the fruit, when dried and properly prepared, produces a well-known "sweet," though now adulterated and superseded in general use by animal gelatine. *Z. Baclei* produces a cake eaten by Africans, with a gingery flavour. In addition to the above, we find mention of *Nitraria tridentata*, belonging to the *Malpighiaceæ*, which grows in the Desert of Soussa, near Tunis; and, among the *Urticaceæ*, or Nettle family, *Celtis australis*, the sugar-berry, has its claims; it is allied to *Cannabis sativa*, the hemp plant, which produces an intoxicating drink called *bharg*, in India; also the *gunjah* for smoking, and the Arabian *haschisch*—substitutes for opium.

The word lotus is also applied to a tribe of *Papilionaceæ*, a sub-order of *Leguminosæ*; but any further reference to them will fail to illustrate our subject.

I am inclined to think that the root-word of lotus will be found in the idea of *lustration*, or cleansing, in connection with Isis. In this aspect we have the Latin verb *lotor*, "to wash," and the Greek *λουτρον*, "a bath," allied words, which



have a close connection with it; further, in the "Odyssey," book ix., we learn that the lotus-eaters incurred oblivion. I think we again find the same idea in  $\lambda\eta\theta\eta$ , the *waters* of oblivion.

And, perhaps, *ber*, *berree*, and *ber-choonee*, Eastern words for the fruit of different kinds of lotus-trees, are analogues of our word "berry."

To conclude: I can only just indicate the reference to Ovid's "Metamorphoses," ix. 324, where he recounts the transformation of the nymph Lotis into a water-plant of the same name, which produces berries, when she was fleeing from Priapus (Fable iv.).

April 25th, 1870.

ARTHUR HALL.

#### WINGLESS INSECTS.\*

MAY I be allowed a small space for a friendly gossip, to which Dr. White has invited me, in reference to my communication with the above title. First, I must thank him for correcting an error. I inadvertently stated that the female Fumea is legless: this is not the case; that defect is confined to the two genera Psyche and Sterrhopteryx. I cordially agree with Dr. White as to the desirability of a liberal allowance of orders in the insect class; and I may state, *en passant*, that for my own use, I employ no less than eighteen. Still, writing popularly in an essentially popular journal—for SCIENCE-GOSSIP, though scientific in the best sense of the term, is nevertheless GOSSIP, and meant to afford reading to all sorts and conditions of men—I thought it better to adopt as simple a method of classification as possible. There are many readers to whom a curious episode in the life-history of insects is agreeable, but who esteem the repetition of technicalities and hard names an unmitigated bore, however useful and intelligible they may be to the practical entomologist. Here let me introduce a small anecdote of a great man. Von Bismarck was not long ago present at a ball in Berlin, given on the occasion of the opening of some public institution. On entering the ball-room, the first person on whom his eye fell was his own tailor. "Ah, Herr Schneider," he said good-naturedly, "what sort of a ball are you having?" "Pretty good, your excellency," answered the flattered tailor; "pretty good, but sadly mixed—sadly mixed." "Very likely," observed Bismarck; "for you know, my dear Schneider, we can't be *all* tailors!"

The moral is, that in so mixed an assembly as the readers of SCIENCE-GOSSIP, all probably are not savants and entomologists, I therefore adopted the simplest of the many systems in vogue—that of Burmeister, adding only a single order, the Strep-

siptera. Now Burmeister (who is, I believe, still living—he was a very few years ago), as great a man in entomology as Bismarck in politics, includes Dr. White's pet horror, the louse, in his hemipterous order. Had I been writing solely for purely scientific readers, I should have placed it with the Rhinoptera of Duméril. But if I am supposed to be joking in the use of an expression anent legless larva, surely Dr. White must be indulging in the same irreverent practice when he wishes to erase the louse from the list of entomozoa, and to shut it out in the cold! Pediculus "probably not an insect at all"! What then, in the name of science, can it be? I believe an insect to be an animal whose body is divided into three segments, with two antennæ and six feet. Pediculus fulfils this definition exactly, and if it is excluded, I know not what we are to retain under the title of insect. [I do not, I confess, in spite of Leach's great authority and Denny's admirable monograph, believe in the hybrid order Anoplura, any more than I do in the more ancient Aptera, under which Pediculus once figured. For the purpose of my paper, therefore, I ranged the Pediculids in the Hemiptera, and the Mallophaga and Thysanura in the Orthoptera, on account of the structure of their mouth-organs. As to the use of vernacular in conjunction with scientific names, I am only acting up to the wishes of the editor, as every contributor to a periodical should do. See "Notices to Correspondents," p. 120: "Wherever scientific names or technicalities are employed, it is hoped that the common names will accompany them." Whether the term "Chimney-sweep" is applied to any other moth I know not, but I can quote two authorities in favour of its being given (as I have given it) to Fumea; viz., Stephens's Catalogue, ii. 57, and N. Humphrey's Genera, p. 34. As to the other supposed misnomer, is Dr. White aware that Stephens's genus Anisopteryx includes Latreille's *Hybernia leucophæaria*?

One word respecting Wallace's Trichondyla and its place in the system. I do *not* "think that it should be removed from the Cicindelidæ and placed among the Carabidæ;" but I *do* think, as I stated, in effect, though not in so many words, that both these tribes (Cicindelids and Carabids) are subordinate to, and form sections of, the great family of Carabini.

Havre.

W. W. SPICER.

QUEKETT MICROSCOPICAL CLUB.—The Annual Excursion Dinner is fixed to take place at Leatherhead on the 23rd of June, for which tickets are ready, and may be had from any member of the Excursion Committee. Many members of the club afterwards regretted their absence from the last dinner; let them take care to prevent such a regret this time.

\* SCIENCE-GOSSIP, vi. pp. 49, 105.



## ON NITOPHYLLUM VERSICOLOR.

**N**ITOPHYLLUM Versicolor is an alga of very rare local occurrence on our shores, nearly allied to *N. Bonnemaisonia*, but from which it differs, and all its congeners, in certain peculiarities that seem to me worthy of the attention and investigation of botanists and microscopists. In old plants the tips of the fronds become hard and thickened into white callous substances, which are eventually fringed with tendril-like fibres. No fructification has ever been detected on this species; and I believe that we should rightly characterize these anomalous bodies among the algæ as leaf-bulbs (*Bulbophylla*), which are fitted to survive the finer portion of the frond, and by means of the cirrhous fibres become affixed to algæ or other surrounding substances suitable for their continued existence. Many other algæ produce these tendril-like appendages at certain stages of their growth; none, however, that I know of, show anything like these peculiar hardened bodies. On examination under the microscope they appear filled with a fine granular mass. Similar callosities arise at the top of the stem at the commencement of the frond; the stem is stiff and woody, seemingly well fitted to survive the delicate frond, which in the autumn would decay away, leaving the leaf-bulb at the top of the stem uninjured.

I have not been able to verify these suggestions from observation, for the delicate texture of this *Nitophyllum* does not admit of growing it in an aquarium; the callous tips, however, I have preserved for six months in sea-water, showing that they are of a very different nature to the rest of the frond. This alga is rare, and supposed to grow in deep water. In this country it has only been obtained at Ilfracombe; and at Minehead and Porlock, on the Somerset coast, I find it most seasons; doubtless it may be cast ashore on the opposite shores of Wales, and in the coming months of June, July, and August, I trust some algæologists will find it there. It is stated to have been found in Plymouth and Jersey, but I have never seen any plants from thence. Youghal, in Ireland, is an old station for it. I am not aware that it has ever been observed on the shores of France, though, if it have been obtained in the Channel Islands, we may naturally look for its occurrence on the French coast opposite.

In studying the algæ we cannot restrict ourselves to the shores of our own country *alone*. To gain a correct knowledge of any species, we must ascertain its geographical distribution; the variation to which it is subject in different localities, and in the case of a species which presents such peculiarities as the present one, it is particularly desirable to find it recorded in fresh localities; I therefore trust these

remarks of mine will lead to its further observation during the approaching season. J. GIFFORD.

## PLANT NAMES.

**H**AVING been engaged for some little time in making notes of the common names of plants which occur in our earlier authors, I am glad to be able to put on record, for the readers of SCIENCE GOSSIP, some few sources of information which afford material help in the inquiry. First, then, comes "Leechdoms, Wortcunning, and Starcraft of Early England, being a collection of documents, for the most part never before printed, illustrating the History of Science in this country before the Norman Conquest, collected and edited by the Rev. Oswald Cockayne; published by the authority of the Lords Commissioners of her Majesty's Treasury, under the direction of the Master of the Rolls." Vol. i. (1864) contains, among other matter, the Herbarium of Apuleius; vol. ii. (1865) has a valuable glossary; vol. iii. (1866) contains the Durham Glossary of Names of Plants, and Saxon Names of Plants with glossary. The price of each volume is ten shillings. Next is a very interesting collection of vocabularies, edited by Thomas Wright, F.S.A., privately printed for Mr. Mayer (1857). It contains Archbishop Olfric's Vocabulary, tenth century; two Anglo-Saxon Vocabularies of the eleventh century, and one of the tenth or eleventh century; a Semi-Saxon Vocabulary of the twelfth century; a Vocabulary of Names of Plants, middle of the thirteenth century; an English Vocabulary, a Nominale, and a Pictorial Vocabulary of the fifteenth century. These all have lists of Names of Plants. The "Promptorium Parvulorum" (Camden Society), vol. i., A—L (1843); vol. ii., M—R (1853); vol. iii., completing the work (1865). This last volume has a valuable preface to the whole work, at p. 67 of which are many references to other works and MSS. bearing upon the subject (including those I have already given). There is a long list of plants, with references to the "Promptorium Parvulorum," on p. 556, note. "A Dictionarie, French and English, published for the benefite of the studious in that language, gathered and set forth by Claudius Hollyband" (1593), gives curious and copious details. Hollyband, whose real name was Desainliens, published other works on language, besides this and "the Frenche Littelton." But I must hasten to close these references with a similar interesting work, the French-English Dictionary compiled by Mr. Randle Cotgrave, with another in English and French, "whereunto are newly added the animadversions and supplements, &c., of James Howell, Esq.," 1650 (first edition in 1611). An intimate acquaintance with the works above described will be a good foundation for further research or be sufficient for most readers. R. T., M.A.



## THE PITCHER OF NEPENTHES.

PROBABLY few objects in our botanical shows are more popular than the Pitcher-plant (*Nepenthes distillatoria*), and not without reason. The plant, as a whole, will not now occupy our attention, though *that* it might profitably do; but we



Fig. 126. A pitcher of *Nepenthes*, sp.

will confine ourselves to the curious pitcher which, as our readers know, depends from the midrib of a leaf of the plant, and is like what is familiarly known as a "hot-water jug," since it is furnished with a "hinged lid," closed when the pitcher is newly formed, but permanently open after it has attained maturity. We may consider this pitcher (*ascidium*) a modified prolongation of the midrib of the leaf from which it depends, though some regard it either as a phyllode, or as a "hollowed leaf;" for the latter it might readily be taken at first sight.

The cut (fig. 127) gives a fair representation of a

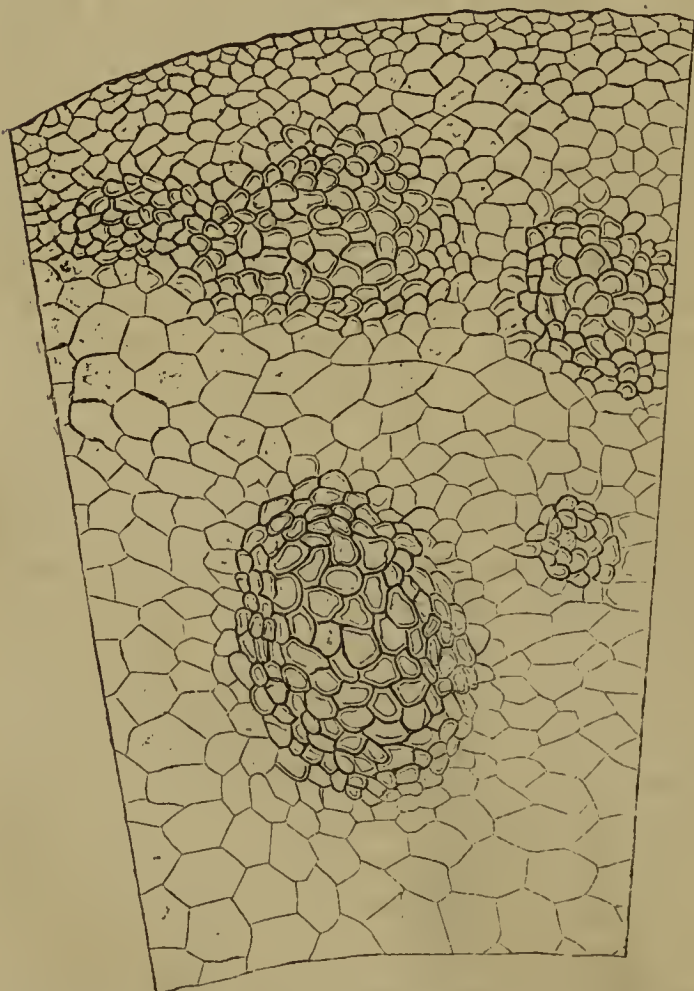


Fig. 127. Section of stem of ascidium,  $\frac{1}{18}$ th of the circle.

section of the stem of the pitcher. It will be observed to differ very materially from the common exogenous stem, and to more closely resemble in its "confused" vascular system the endogenous stem. The "vessels" are chiefly spiral, of the quadruple type, and are generally stained with a deep orange-colour. The spirals—not the vessels by which they are surrounded—are thus stained, inclining one to the belief that it is *they* that act as conduits for the orange-coloured fluid which, we shall notice further on, is contained in glands and glandular hairs on and in the pitcher. This phenomenon if worked out may perhaps throw some light upon the histology of the vascular system of plants generally.

Just before the stalk joins the pitcher it becomes hollowed out; in fact, the pitcher really commence

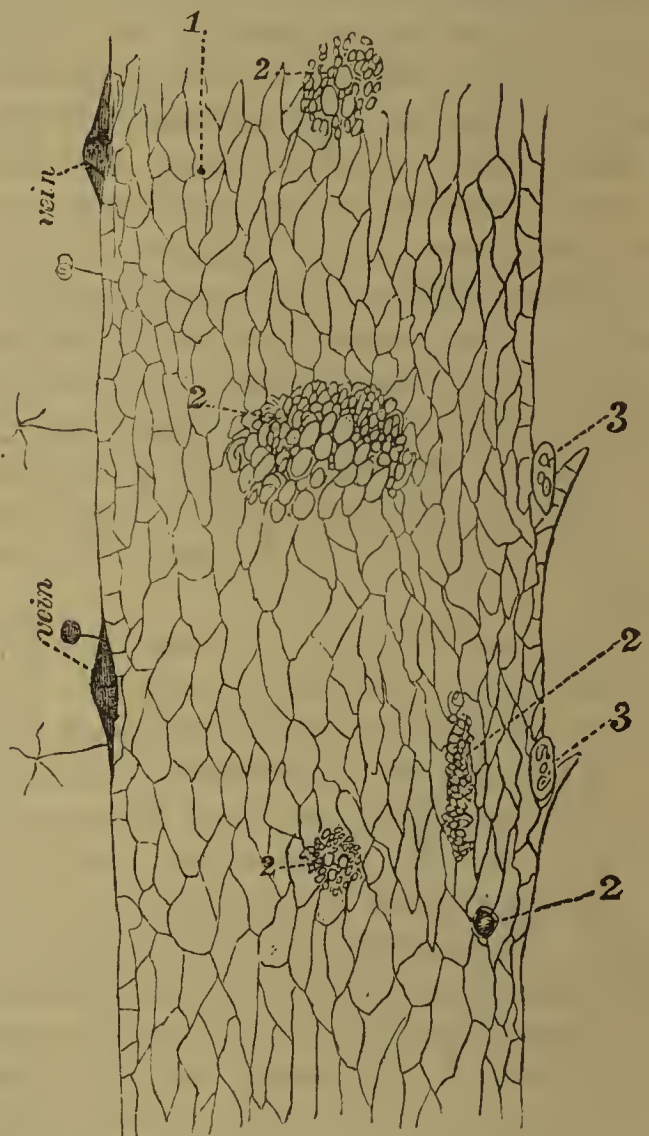


Fig. 128. Vertical section of ascidium.  
1. Parenchymatous tissue. 2. Vascular bundles.  
3. Glands with protecting hood.

at this point, and expands suddenly after it has turned the curve. The various vascular vessels are distributed over the pitcher; the circumferential ones, with others which anastomose with them, marking out the external surface of the pitcher into a vast number of irregular four-sided figures. On the exterior of the pitcher are a number of stellate hairs (free from silex, and *not* good polariscope objects) and glandular hairs; the latter contain the orange fluid previously spoken of, which, however, on a lengthened exposure to air and light, turns black. We may notice here that the upper edge of the pitcher (or its rim) is most peculiarly constructed; the vessels run beyond its margin and



form a kind of fringe which, inside the pitcher, may possibly be regarded as a *chevaux de frise*. Probably it serves the purpose of a "selvage" or "hem," such as ladies take care to place at the outer edge of any bag they may make, for the double purpose of "making a finish," and of strengthening the "mouth" of the bag.

If we examine under the microscope a narrow strip of the membrane, cut from the bottom of the pitcher to the top, we shall notice, first, near the upper portion, an elaborate system of inverted pouches, or, more correctly, "hoods;" lower down these are less deep, and a yellow granular mass is just perceptible within each hood; still lower we see a pit or depression, each with its yellow granule, now seen to be a sessile glandular hair or gland; and at the very bottom we see the sessile gland on the

plane membrane. At first sight we suppose the upper hoods to be furnished with a fringe, but this appearance is illusory, and results from the peculiar cuneiform arrangement of chromule (orange, or, more usually, crimson) within the marginal cells. We may note here that this chromule is contained within the compressed cells of what we may call the cuticle of the ascidium.

We give a sketch (highly magnified) of one of the "yellow granular masses," found in the pouches; they are of a deep-orange colour, curiously marked on the exterior. With Schulz's test we obtain the cellulose reaction in the investing membrane. Upon the gland it has no effect. We treat the glands as follows:—

Apply chloroform, the gland shrinks in size, but rapidly expands again; the colour is not destroyed, but a small quantity of oil has been dissolved out. Ether and ben-

zole have the same effect. Millow's test gives a slight albuminous reaction. Sulphuric acid (diluted) has no marked effect. Nitric acid strikes a yellow colour. These tests do not go to prove much; perhaps only this, that the glands have a cellulose investing membrane; that the gland itself is an azotized compound, and contains a limited amount of essential oil, or possibly only chromule.

We have spoken of these granules as "glands."

That they really are such is beyond all doubt, and it is also nearly as certain that they are identical in kind and purpose with the other glandular bodies, hairs or sessile glands, so plentifully distributed over both surfaces of the pitcher. If we dissect the membrane, we shall see that these glands are connected with a subcutaneous system of vessels that are more or less stained with the same orange fluid (fig. 128 gives a sectional view of the membrane), and that the inner subcutaneous layer is little else than a mass of interlaced spiral vessels. The question now arises as to the function these glands perform in the economy of the plant. That they are, or sometime have been, of use, we need not doubt, as there is no *waste* "pure et simple" in nature. They are too numerous to be merely accidental, their arrangement also is too regular, and we may, I think, connect them with the peculiar secretion of the pitcher. Are they then organs of excretion or secretion? They *can* absorb (or secrete), as may be proved by any one who will place a shrivelled one in fluid; and other experiments lead one to suppose that they can excrete also. Of what use are the fluid contents of the pitcher? Dr. Voelcker has analyzed the fluid contained in the pitcher. He writes:—"The liquid was generally clear and colourless, rarely yellowish, and it reddened litmus. That which was collected from different plants yielded respectively 0.92, 0.91, 0.87, 0.62, 0.52, and 0.27 per cent. of residue, which contained in 100 parts, 38.61 of organic matter, consisting principally of malic acid with a little citric acid. The inorganic matter contained 50.42 of chloride of potassium, 6.36 soda, 2.59 lime, and 2.59 magnesia. Stated in a different form, an imperial gallon would contain from 644 to 189 grains of solid matter in solution, which is but three or four times that in ordinary drinking or spring water, taking the average of each. It will be observed that the organic constituents are merely those which are common to many fruits, and give the genial acidity to our Devonshire cider, as well as to our apples, pears, and common fruits. Hence we are not surprised to learn from the botanical friend (Mr. John Carpenter) to whom we are indebted for our specimens, and who has tasted the fluid, that "it is almost tasteless, very slightly sweet, but not in the least sour." He considers that "thirsty travellers might drink the liquid with pleasure and benefit, the more especially as, from growing on trees and amongst the leaves, it would be cool and refreshing." Here, then, is one *possible* use for the fluid. The liquid is, it appears from the above, slightly saccharine. Can it be that this is for the purpose of attracting insects, that the fluid is intended to drown them, and that our pretty *Nepenthes* is carnivorous? There are plants which appear to be of this character; but we do not think it of *Nepenthes*. The only morphological peculiarity besides the fluid, which would support such a



Fig. 129. Stages of development of glandular system.

1. Sessile hairs.
2. Pits with sessile glands.
3. Shallow pouches.
- 4, 5. Deep pouches.
6. Gland.



theory is the fringed margin of the pitcher. On the whole, we incline to the opinion that the pitcher is simply a reservoir, in which, in times of plenty, the surplus fluid may be stored for the future use of the plant, and that the glands serve in the one case to excrete the fluid, and in the other to reabsorb it; or it may be that the fluid is intended to attract insects to the plant, that, after they have satisfied their thirst, they may visit the flowers and aid in their fertilization.

We have now only time to mention that our scientific equanimity was sorely tried during our dissections by the presence of some form of tannio-gallic acid, which, acting upon our cutting instruments, struck an intense black, spoiling our sections and not improving our instruments. However, we revenged ourselves by getting portions of the stem bruised, boiled with water, and tested with per salts of iron, by way of satisfying ourselves that the source of our trouble was really a misplaced black ink factory.

There are still many points left unnoticed upon which we would have liked to have written, but we will conclude by commending *Nepenthes* to the attention of our readers. H. POCKLINGTON.

#### NEW BRITISH SHELLS.

By J. GWYN JEFFREYS, F.R.S.

I LATELY received from Mr. Thomas Rogers, an active and enthusiastic naturalist at Manchester, specimens of a small *Planorbis*, for my opinion. He discovered them in the Bolton Canal. They proved to belong to a species new to Europe, viz. the *P. dilatatus* of Gould (*P. lens*, Lea), which was originally found near Cincinnati, and inhabits an extensive tract of the United States. The shell is about the same size as *P. nautilus*, which may be considered its nearest ally; but it has one whorl less, the periphery is angulated, the under-side is remarkably gibbous, the mouth is very large, squarish, and scarcely oblique, the outer lip is expanded ("so as to make it trumpet-shaped,"—Gould), and the umbilicus is abruptly contracted, small, and deep. Some of the Manchester specimens are more or less distinctly, though microscopically, striated in the direction of the spire. The following is a description of the animal or soft parts:—

*Body* dark grey, often with a slight orange tint, closely and minutely speckled with flake-white: *mantle* thick, lining the mouth of the shell: *head* large and tumid: *mouth* furnished with broad lobular lips: *tentacles* cylindrical and extensile, widely diverging, broad and triangular at the base; the sheath or outer part is gelatinous, and the core or inner part is of a much darker colour and apparently greater consistence; tips rounded: *eyes*

sessile, on the inner base of the tentacles: *foot* oblong, squarish in front, and bluntly pointed behind: *verge* curved, on the left-hand or umbilical side of the shell. The spawn is arranged in an irregular mass containing about a dozen membranous capsules, each of which has a yellowish yolk or vitellus in the centre.

It is active, and occasionally creeps, like many other aquatic Gastropods, on the under surface of the water, with its shell downwards.

Inhabits the Bolton and Gorton Canals at Manchester.

Suspecting that this American species had been introduced into our canals through the cotton-mills I wrote to Mr. Rogers for information; and he tells me that in one habitat (and probably in the other also) the waste from the first process or "blowing-machine" is discharged close to that part of the canal where the *Planorbis* occurs. As the best cotton is cultivated in river-bottoms, and the crop, when picked, is spread out and dried, nothing is more likely than that it should take up either the *Planorbis* or its eggs; and these could be transported alive to any distance. The vitality of *Planorbis*, and its capability of enduring considerable changes of temperature, may be inferred from the habit which certain species are known to possess of closing the mouth of the shell in summer (when the shallow pieces of water in which they live are dried up) with an epiphragm or membranous lid, to exclude the heat and prevent the evaporation of the natural moisture. Thus protected, they keep alive for weeks, and even months, until the return of the rainy season.

In connection with the foregoing, I would suggest that *Sphærium ovale* may have been introduced in the same or some other way from the United States. That species also inhabits the canals near Manchester, and may be the *Cyclas transversa* of Say. It has long been known in this country. I have a specimen which was in Dr. Turton's collection of British shells more than forty years ago.

I have written to Mr. Anthony, of Cambridge, Mass., one of the leading conchologists in the United States, for information as to the range of distribution there of both these species, and especially as to whether they, or either of them, inhabit the cotton-growing districts.

Several species of land shells (c. g. *Zonites cellarius* and *Helix nemoralis*, var. *hortensis*), and perhaps of freshwater shells also, are supposed to have been introduced into North America from Europe by the agency of man, and are now thoroughly acclimatized in the former continent.

My correspondent, Mr. Thomas Rogers, of Manchester, has added another species to this well-worked department of our fauna. Specimens of a *Zonites* which he has now sent me, collected by him



under stones at Marple Wood, in Cheshire, prove to be the *Helix glabra* of Studer, Fér. Prodr. No. 215. *Z. glaber* has a wide range on the Continent, from Normandy (where I have taken it), through France, Savoy, Switzerland, Germany, and Dalmatia, to Epirus in Greece. I also found the same species in 1846 at Grassmere, and in 1857 at Barmouth, but had overlooked it. Mr. Rogers's specimens being alive, I subjoin a description of the animal.

Body dark bluish-grey, striped like a zebra on each side in front, and irregularly mottled behind; in one of the specimens the hinder part of the foot is minutely speckled with yellowish-brown dots; two narrow and slight parallel grooves run along the neck from the head to the upper lip of the shell; the surface is more or less wrinkled, and has a few large but indistinct lozenge-shaped markings: *mantle* very thick and dark at the mouth of the shell, over which its edges are folded: *tentacles*, upper pair rather long, and finely granulated; lower pair very short: *eyes* small, placed on the upper part, but not at the tips, of the tentacular bulbs: *respiratory orifice* round, occupying the centre of the pallial fold: *foot* very long and slender; the sole appears as if separated from the upper part of the foot, being defined by a darker line: *slime* thin and nearly transparent. I could not detect any smell of garlic (so peculiar to *Z. alliarius*), although I frequently irritated the animals.

The shell is three times the size of that of its nearest congener, *Z. alliarius*, and is of a reddish-brown or waxy colour; the whorls are more convex or swollen; the lower part of the shell is not so much arched, the mouth is larger, the umbilicus is smaller and narrower, and the colour underneath is sometimes whitish.—*Ann. and Mag. Nat. Hist.*, April, 1870.

### THE SCOTCH THISTLE.

A CORRESPONDENT wishes for information as to which of the thistle tribe is the true Scotch thistle. This is really a puzzler. If we are to place any reliance on the figures which profusely ornament many of our old Scotch books, or take as true representatives of any natural plant those vile excrescences which the older Scotch architects have stuck up in every possible shape and form, as finials to doors and windows, gable-heads and doorways—a taste which some of the modern professors of the art seem so very anxious to copy—or if we trust to the taste of sculptors in stone or engravings in metals, we must conclude that the species from which one and all of these thistles have been taken are either now lost to the flora of Scotland, or else that the representations are as great a piece of imaginative caricature as the animal with one horn

that forms one of the supporters of the Scotch crown. Many different species have been dignified with the name of Scotch thistle. It is probable, say some authorities, that a common species such as *Carduus lanceolatus* is most deserving the name. Some have fixed on doubtful native species, such as *Silybum Marianum* and *Onopordon acanthium*. Neither of these is, however, reconcilable with history. *S. Marianum* is appropriated by the Roman Catholic Church, who say the white marking on the foliage is commemorative of milk of the Virgin Mary. *O. acanthium* is not only, like the last, a doubtful original species to Scotland, but like *C. lanceolatus*, of much too great a height; for one historian says, that, after the landing of Queen Scots, she reviewed her troops, and being fatigued, retired, and on sitting down was pricked by a thistle; from which circumstance she adopted it as the arms of her new country, with the motto, "Nemo me impune lacessit." Another says, on the eve of an attack by the Danes, one of the enemy having trod on a thistle, cried out with pain, which gave intimation to the Scots of their near presence, and hence the thistle became dignified as the arms of the country. With these two exceptions, we meet with no other reference to a matter of equal importance, in an historical point of view, with that of the legends in connection with the Coronation Stone, which all historians have treated on with great minuteness. However, if any reliance may be placed on the authorities above given, it is quite clear that it must have been a low-growing species like *Cnicus acaulis*; for, whether we take into consideration the accident to the Queen, or the bare-footed Dane, or the configuration of the flower head itself, it more closely resembles the representations we find on many of the sculptured stones than either of the others. Some have supposed it to be *Carduus acanthoides*; but this, as well as all the rest, is less formidably furnished with those strong, spiny scales with which the receptacle of *Silybum Marianum* is so amply provided. This circumstance, while it agrees better with those sculptured representations found on the oldest parts of Stirling Castle, Linlithgow Palace, or Holyrood House, especially with one on the top of a garden doorway opposite the new fountain in front of the entrance to the latter, which is more like the head of *Cynara Scolymus*, the globe artichoke, a native of the south of Europe, than any thistle in the world. Uncertain as we are regarding the species of our national emblem, or even of its being a native, we are no more so than the English are regarding the species of rose they have adopted. No double roses existed in Britain at the period it was introduced into the national escutcheon; therefore, it must have been borrowed from the French, who, even in their turn, cannot now tell what species of iris their fleur-de-lis is meant to represent. Nor are the Irish agreed as



to whether their shamrock is derived from a series of *Trifolium*, or from *Oxalis acetosella*. The ancient Britons, as the Welsh call themselves, have adopted the leek, *Allium Porrum*, a native of Switzerland.—*Scottish Farmer*.

#### EGGS OF BIRD PARASITES.

THE eggs of insects have long been favourite objects for the microscope; and those who possess a fair series of them will acknowledge that

face of the feathers, they actually appear like some new species of sea-mat.

The strangely-formed eggs found on the Australian Crane are arranged in a similar manner, and a slide containing several rows of these eggs is a fine sight under the microscope.

On one species of Crowned Crane (*Balearica*) are found eggs having a thick calcareous wall; being covered, as it were, with little white domes. Each of these projections appears to be deposited around, and supported by, a short spine proceeding from the



Fig. 130. EGGS OF BIRD PARASITES.

A. Ovum of a Nirmus,  $\times 50$ .  
B. Australian Mallee-bird,  $\times 60$ .  
C. Black-winged Peacock,  $\times 60$ .  
D. Crowned Crane,  $\times 60$ .  
E. Bohemian Pheasant,  $\times 45$ .

F. Australian Crane,  $\times 30$ .  
G. Ground Hornbill,  $\times 60$ .  
H. Ground Hornbill,  $\times 38$ .  
I. Temminck's Tragopan,  $\times 45$ .  
K. Golden Pheasant,  $\times 50$ .

they well deserve the admiration they have excited. It is, however, among the little bird parasites (*Mallophaga*) that are found the most extraordinary and apparently fantastic structures.

The eggs of one of the species which infest the Ground Hornbill so much resemble the cells of some of the Polyzoa, that, deposited as they are, in close contact, one above another and in many parallel lines, between the flattened barbs on the inner sur-

chitinous shell of the egg, and terminated by a sub-quadrangle, peltate disk. The transparent tube, forming the opening at the summit of the egg, and the sunk operculum, bearing a little central tassel of curved and clavate spines, are characters unlike those of any other parasitic egg with which I am acquainted.

The egg of a parasite of the Australian Mallee-bird resembles somewhat in figure the ripe fruit of



the corn blue-bottle. The spines of the lowest or outer row on its summit are ornamented by little anchors, very like those of the spicula of Synapta.

All these interesting eggs are, however, altogether exceeded in beauty of form by those found on the Indian Black-winged Peacock, the *Pavo nigripennis* of Sclater, which are constructed so much like flowers, that a botanist might amuse himself by describing every part of them in the technical language of his science.

The manner in which these eggs are deposited is also most singular. The animal attaches a mass of amorphous secretion to the inner side of the shaft of a feather, and then proceeds to construct two or three oval perforated or punctate sacs, much larger than the eggs, and looking like some of the Polycistineæ (*Radiolaria*). On and about, and in some cases buried in, these strange sacs, are found the eggs in considerable numbers; the whole arrangement making an object for the binocular microscope which every collector will, I feel assured, be most anxious to obtain.

It is of course extremely difficult to tell the genera to which these eggs respectively belong. One might suppose a long thin egg to be that of a *Lipeurus*; a stout capacious one, that of a *Goniodes*, or a *Docophorus*. With foreign birds especially it is almost impossible to do more than form a probable guess on the subject. The egg called that of a Nirmus, in the illustration, may be so, and I think is so; but I am shy of my authority; and the commonly used term "Nirmus" may mean anything or nothing.

One egg alone, among those figured, that of the Ground Hornbill (fig. H), I am able to define certainly as that of a species of the sub-genus *Colpocephalum* of Nitzsch; having the conclusive proof of an example of the parasite with two of these eggs in its abdomen. The long, thin egg from Temminck's Tragopan is, I have little doubt, that of a large *Lipeurus*, several specimens of which, from the same bird, are now in my possession.

That all these ova are those of the widely-extended genera *Philopterus* and *Liotheum*, may, I think, be assumed with tolerable security; as notwithstanding the great variety of their forms, it will be seen that they are all constructed on the same general plan. They are not the eggs of the sucking parasites (*Pediculidæ*), as these are not found upon birds, and lay eggs of a different character. The eggs of the metabolous fleas, as might be expected, are simple, oval sacs, entire and inoperculate. The Bugs (*Acanthidæ*) certainly lay eggs somewhat similar to those of the Mallophaga in form; but they are very rarely found as parasites upon birds, and their ova are wanting in the appendages to the opercula which generally characterize the eggs of the true bird parasites.

In examining a number of these slides, we can pass gradually from the simple and well-known

forms to those of more uncommon character; and thus arrange almost a series, crowned by the eggs of the Mallee-bird and the Black-winged Peacock. The most aberrant from the usual type are those found on the Ground Hornbill (fig. G) and the Australian Crane; but I am strongly of opinion that if ever they are made out with certainty, they will also prove to be those of true Mallophaga.

When a novel and interesting little corner of the immense field of nature is opened before us, it is but just that we should acknowledge to whose assiduity and careful research we owe the delight it has afforded us; and it is with pleasure that I fulfil this duty by stating that these beautiful objects have been discovered and brought into notice by Mr. J. T. Norman, of the City Road.

Perhaps even this necessarily slight and incomplete sketch may induce some naturalist or microscopist to pay attention to a little-known page in the wonderful book we are all trying to decipher.

The Peacock in this country has a fine species of *Goniodes*, and the common Turkey is infested by a large *Goniodes* and a *Lipeurus*. The eggs of all these parasites will most probably supply interesting slides for the cabinet.

On reflecting how long these things must have existed before our eyes, unseen or disregarded, we cannot but be impressed by the wonderful variety and lavish fecundity of organic nature.

Over her most beaten paths novelties lie scattered in marvellous profusion; and those who love to search out and contemplate her ways, will see, even in the minute eggs of these despised parasites, something to be admired more than their strangely ornamental shapes. They will see what the student of organic life is always seeing—the sign-manual of an inventive power, sublime beyond conception; an almighty will, ubiquitous, eternal, and divine.

Kensington.

H. C. RICHTER.

#### MUSICAL INSECTS.

WHILST residing in the remote and almost inaccessible village of Taganana (towards Point Anaga), in the north of Teneriffe, during the spring of 1859, my attention was called to a peculiarity in a beautiful species of *Acalles* (I believe the *A. argillosus*, Schönh.), which I do not remember to have seen recorded concerning any other coleopterous insect whatsoever. It was on the 22nd of May that my Portuguese servant (whom I had sent out to collect) brought me home eleven specimens of a large *Acalles* which he had captured within the dried and hollow stems of a plant growing on the rocky slopes towards the sea, and which I have but little doubt (from his description) was the *Kleinia neriifolia*, DC., so common throughout the islands of the Canarian archipelago. I had been accustomed to find such a number of insects in the dead branches of the various Euphorbias, that my



attendant also had discovered, from time to time, the *locus quo* of many a rarity by imitating my method of research ; and, to use his own expression, he was about, in this instance, to throw away these rotten stems as worthless, when he was arrested by a loud grating, or almost chirping, noise, as of many creatures in concert ; and on looking closer for the mysterious cause, he detected a specimen of *Acalles*, from which it was quite evident that a portion of the noise proceeded. On shaking the hollow stem, so as to arouse its inmates, and putting his ear alongside it, the whole plant appeared musical, as though enchanted ; and it was evident to him, therefore, that there were more of the performers within,—a conjecture which proved to be correct, for, on breaking open the branches, he captured nearly a dozen of them. So pleased was I with the accomplishments of these anomalous musicians, when brought to me, that I felt quite a reluctance (even though an entomologist) to put them to death. I therefore made a compromise with my feelings, and killed only eight of them. The remaining three I kept alive for several weeks, and even took them to Madeira—where, however, they unfortunately died (as I imagine, from hunger) just before embarking for England. So long as they lived, however, it was a constant source of amusement to make these creatures stridulate, or “sing,” as it was usually called, which they would invariably do, for almost any length of time when alarmed,—as for instance, when held between the finger and thumb, and slightly pinched. In this manner I have had four of them chirping at a time ; and so loud was the noise produced that it might be heard at a distance of many yards. Whether all the *Acalles* have this remarkable power, I will not undertake to pronounce ; but so far as the numerous representatives from the Atlantic islands are concerned, I have but little hesitation, from the general appearance of the constricted apical region of their elytra, in believing that they have. And, indeed, this conjecture has been absolutely verified in five of the Madeiran ones by the direct and careful observations of Mr. Bewicke, from whom I have received some very interesting remarks concerning them. On my arrival at Funchal, from Teneriffe, in June 1859, I exhibited my specimens (then in a lively state) of the *A. argillosus* to Mr. Bewicke, and requested him to listen attentively to the Madeiran species, whenever he chanced to meet with them, during the following summer, in order to ascertain whether or not they had a similar stridulating propensity ; and I have since been assured by him that he has heard the music constantly in the *A. dispar*, *nodiferus*, *terminalis*, and *ornatus* ; and that “it was distinctly audible” in even the minute *A. Wollastoni*.—*Wollaston, in Annals of Natural History for July 1860*, where a description of these creatures’ curious musical instruments is also given.

#### WILD CHINESE SILKWORM.

I HAVE incidentally alluded to a coarse kind of silk, produced by caterpillars which feed upon the leaves of the *Fung* tree (*Liquidambar Formosana*). The cloth made from this silk is known to the Chinese as *Ching Heong Kien* ; and, judging from samples before me, though coarse in appearance and cheap in price, is very strong and durable. I regret that I have not been able to trace, under my own ocular observation, the various stages of its manufacture from the cocoon to the cloth itself : on this point my remarks are based on Chinese information ; but the same source has been proved correct in respect to those phases of its production which appertain more especially to the naturalist ; and, in the absence of any special reason for doubt to the contrary, it may be fairly assumed that my several independent informants have not led me into error as to the cocoons from whence is derived the cloth of which they have furnished me with samples.

On the 12th of May last year (1860) I procured from Sai-ts’iu Shán, a hill of some celebrity about twenty-five miles westward from Canton, a supply of the worms still feeding on the leaves of the *Fung* tree ; some of these I preserved in spirits ; some I tried to feed, but they refused mulberry-leaves, and a supply of their proper food was not easily obtainable ; consequently they were lost, except a few, which were apparently driven by their confinement to spin premature cocoons.

Unsatisfactory, however, as were the results of this experiment, the few imperfect cocoons thus spun by the confined worms were sufficient to prove the identity of a supply of cocoons brought to me from the same place shortly afterwards ; these were adherent to the twigs of the *Fung* tree, and in this state I kept them till about two weeks ago, or more than seven months after they were brought to me, when my patience was rewarded by the issue of several moths of both sexes. Accidents caused by cats and coolies happened, however, and of these moths I succeeded in preserving only one perfect specimen.

In attempting a description of this insect in its various stages, I beg indulgence for my ignorance of the science, and even of the technical phraseology of Entomology.

The worm is from 2 to 2½ inches in length, and about half an inch in diameter ; the under surface of the body is of a sea-green colour, and the sides and back are marked with six pale yellow and five sea-green longitudinal stripes, the outer stripes on either side being of the former, and the central or dorsal stripe of the latter, colour ; on each of the yellow stripes are eleven obtuse tubercles (except on the outer stripes, where the hindmost one is obsolete, or nearly so), about one-tenth of an inch in diameter and the same in height : in other words, there are eleven transverse rings, each of six tuber-



cles, except the hindermost, where two are more like legs deficient: these tubercles are each surmounted by about half a dozen hairs stellately arranged and varying in length from one-tenth to half an inch.

The cocoon is of a brown colour, by no means of a silky appearance; it adheres by a strong gummy adhesion to the twigs, or in the angles of twigs of the tree on which the caterpillar feeds: without the application of moisture it cannot be separated from the wood, except by the use of force sufficient to destroy it; the fibres of which it is composed are also fastened together by the same substance. It is somewhat pear-shaped in form, and has an opening at its narrow end, through which I suppose, for I have not witnessed the operation, the perfect insect escapes; at all events after the escape of the moth there is no other visible channel through which it would have made its exit.

The moth (my specimens, be it remembered, were produced under unfavourable circumstances) has from four to five inches spread of wing; the wings are alike in both sexes; they are of a pretty pale pink ground, with elegant markings of a brown colour of various shades; on the outer wings these markings rise, as it were, in irregular sharp peaks, like the diagrams of the relative heights of mountains given in our modern atlases; each of the four wings is furnished with a beautifully-marked eye of various colours, and deeper hue than the other markings; the body of the female is an inch and a quarter in extreme length, and four-tenths of an inch thick, a thickness which is maintained to the very extremity; at first it is densely clothed with black hair, on which, however, rings of a pale pink colour subsequently make their appearance. The body of the male is smaller, but in other respects similar. The antennæ are about half an inch in length; in the female sharply pectinate, and in the male of that elegant plumose form which characterizes the *Bombycidae*.

In Hardwicke's SCIENCE-GOSSIP for November 1869 is a plate (taken from the *American Naturalist*) of an American moth, named *Telea Polyphemus*. Except in the more delicate markings of the wings, which may not be faithfully shown in an ordinary woodcut, this moth bears considerable general resemblance to that now under notice; the plate of the pupa form is also very similar; the cocoon is represented as partly folded in a leaf, and this appearance often occurs in the case of the Chinese moth, though it arises from the accidental adhesion of a leaf to the cocoon before its gummy matter becomes dry. The worm of the *Telea* seems to differ considerably, and some of the author's remarks tend to show that it is by no means identical with the Silkworm of the *Liquidambar* trees; nevertheless this reference to it may serve to help me through my inability to treat the subject with scientific accuracy.

The name of the manufactured silk *Ch'ing Hong Kien* is derived from that of the place in Kaying-

chau where it is chiefly produced; the cocoons collected in the neighbourhood of Canton are not utilized on the spot, but are taken elsewhere (to Kaying-chau, I am informed) to be manufactured. Besides this application of the cocoon, silkworm gut is obtained from the caterpillar, as pointed out by an Amoy correspondent in "Notes and Queries" (vol. iii. p. 47), and as stated to me by an observant naturalist who for some time resided in that port. The silkworm gut is employed in the manufacture of nets and lines for fishing purposes.

In Chinese botanical works at my disposal I find no mention of the *Fung* tree leaves affording food to silk-producing insects; but I may here point out that on page 1 of the 35th chapter of the "Chih Wuh Ming Shih T'u K'ao" is an excellent engraving of the tree, which, as representing general outline and habit, would be no discredit to a wood-engraver of occidental skill, though of course it is deficient in, nor does it aim at, anatomical accuracy and correctness of structural detail.

Canton.

THEOS. SAMPSON.

#### FOXGLOVE (*Digitalis purpurea*).

I HAVE always been of opinion that "fox" was an ignorant change, entirely devoid of meaning in the case of the *Digitalis*, for "Puck," and that *Puck's gloves* is the true reading of the name. I shall endeavour to show, both from the Irish and Welsh, the decided connection between the *Digitalis* and the Puck order of sprite. In Ireland the Foxglove is called Lusmore, which in English means *important weed*, or *great herb*, so called from its being the favoured plant of supernatural beings, more particularly of the "good or great people" (*i.e.* fairies). In Anglo-Irish we call it "fairy cap," fairy bell, hair bell, fairy weed, fairy glove. Its flowers are believed to form the cups of a certain class of sprites belonging to the order Puck—a very rural, cattle-loosing, mischief-breeding set of fairies. In my mind the Pucks are closely allied to the Satyrs and Nymphs of the ancient Romans and Greeks, and were imported both by the Romans and Norsemen into this country; but, as our small islands could scarcely contain a quantity of these frill-bodied creatures, they have, to suit our limited acreage, dwindled down to fairy rank. Their fondness for children, for carrying or spiriting away maidens, and their partiality for cattle, and assuming their form, is very much in favour of my view of their origin. The he or buck goat is indirectly connected with the Puck, as he was also to the Satyr of Mythology; hence, in Irish, we read Puckawn or Puccan, the former meaning an abominable foetid old goat, the latter a young he-goat. The form of the goat was one common to the Puck; hence we find the celebrated waterfall Poul-a-pouka (*hole of the he-goat*, or *chasm of the Puck*); and this, though not



relating to gloves, shows the class of sprite that dressed his head with the rakish caps formed out of a foxglove heel; and, according to its other name, "fairy glove," perhaps his hands or arms. It would not be a much greater stretch of imagination than in many other derivations to read love instead of glove, and make it "Puck's love," which, when read after Lusmore, great or fairy-loved herb, would not appear strange. In support of this, the country people *used* to believe that each plant of *Digitalis* was a fairy home, and that the little creatures used to scuttle into the bells, thus *gloving* themselves from observation when a passer-by disturbed their revels. The fairy herb keeps its stem bent, as a salute to any supernatural being that should pass, and also from the weight of so many nightly gamblers amongst its bells; the flowers that have fallen from its stem are the discarded caps and clothing of the last night's revellers. In every sense, and amongst all imaginative European races, the *Digitalis* is allowed to be, *par excellence*, the fairy or supernatural plant, and certainly to have nothing to do with the fox. Not being a Welshman, I am not learned in their fairy lore, so will make no further remarks than that the *Digitalis* is called, in Welsh, Menyg Ellyllon (*Puck's gloves*).

Dalkey, Co. Dublin.

HARRY BLAKE KNOX.

### THE SHREW.

SOME time ago you inserted my observations on the Hedgehog, which I had thrown together in the hopes that, being personal, they might remove absurd prejudice, and establish the great usefulness (agriculturally viewed) of that despised animal; and I had, a short time since, the gratification to hear a farmer, hitherto a despiser, so much of a convert as to scold soundly his farming boy for destroying a brood. I now make a like appeal for a much smaller, though I believe equally useful animal, the Shrew, one who has been equally the victim of prejudice, in that our forefathers considered it venomous to the extent that not only its bite, but the mere run of the creature over the foot, was sufficient to cause lameness. Although this is no longer held a fact, yet being called "Mouse," and having soft fur and a long tail, he is ruthlessly destroyed with that troublesome class. My observations have been, I own, more scanty than in the case of the Hedgehog, for several reasons: the extreme nimbleness and activity of the creature renders it very difficult to be procured unhurt, and to be kept where the comforts are sufficiently studied to induce it to show its natural habits. It was near three months, last autumn, although the animals were tolerably plentiful and the farmers most obliging, before they succeeded in catching the nimble little beast unhurt. The delay was annoying, as the early frost began to kill, and to drive to winter quarters, their only

food. Of four thus procured, three got away before they were half tamed; I think the efforts to escape were made more desperate through the very unhappy domestic life they led. I could not ascertain the sexes; but from difference of colour and size, they were, I think, not all of the same, for no one met another without squeakings and fights so desperate that I have been obliged to thrust my fingers between them to prevent murder, they rolling over and over like two tom-cats. The one brought to town lived but three months, having become perfectly tame, and so playful as to chase after slips of soft paper, and run off with them into his bed (a box with a small hole in it), showing much cleverness not to tread on it in entering, by thrusting, in the corner only, running in himself and pulling in the paper from the inside. Their food was exclusively insect when procurable, from blue-bottle, beetles, caterpillars, down to worms, and even aphides; wasps which I had killed and removed the stings from, deeming it too formidable a weapon for so small a creature, they even eat. Can they dare to encounter such in nature? A little meat and bread and milk were obliged to be supplemented as winter advanced; but they did not like it, and it disagreed with them even more than with the Hedgehog. I was once a little staggered by their seizing a pea and wheat grains, and running off to thrust them in a corner; but I found every one again when cleaning out their domain, and I now believe it was done in playfulness: no sort of grain or vegetable is taken by them as food. In seasons abounding in insect vermin, they doubtless destroy far more than they can eat. The staple food of my London visitor was the black-beetle; those he would rush after and overtake in a moment, and begin to devour: put in another, he would catch that, disable, and carry it to some safe place, then return to eat the first; this he would continue to do with every additional beetle: he could eat two or three large cockroaches in succession. They are able to kill and eat the large evening drone or dung beetle, a creature not very inferior in size to themselves, supposing the fur removed. The extremities are most delicately formed, yet their strength is sufficient to move boxes, &c., twenty or thirty times their own weight.

The very small eye and long snout, in common with our other two insect-eaters, the Hedgehog and Mole, are against their personal beauty. Extreme definition rather than light seems to be important to enable them to dart with unerring celerity on their nimble prey; and the extended nose not only furnishes an exquisite sense of smell, but in the Shrew the movable snout, which is pointed in all directions with extreme quickness, seems to enable it to ascertain the exact spot where the scented game is to be looked for, as an Adams directs his elongated eye to the region of a suspected planet.

GEORGE COX.



## ZOOLOGY.

SEA-CUCUMBERS.—The *Holothuriæ*, or Sea-Cucumbers, may be regarded in one light as soft sea-urchins, and in another as approximating to the annelides or worms. Their suckers are similar to those of the true star-fishes and sea-urchins. Besides progression by means of these organs, they move, like annelides, by the extension and contraction of their bodies. The mouth is surrounded by plumose tentacula, the number of which, when they are complete, is always a multiple of five. They all have the power of changing their shapes in the strangest manner, sometimes elongating themselves like worms, sometimes contracting the middle of their bodies, so as to give themselves the shape of an hour-glass, and then again blowing themselves up with water, so as to be perfectly globular. The great Sea-Cucumber is the largest of all the known European species, and probably one of the largest *Cucumeriæ* in the world, measuring when at rest fully one foot, and capable of extending itself to the length of three. Under the influence of terror, it dismembers itself in the strangest manner. Having no arms or legs to throw off, like its relations the luidia and the brittle-star, it simply disgorges its viscera, and manages to live without a stomach; no doubt a much greater feat than if it contrived to live without a head. According to the late Sir James Dalyell, the lost parts are capable of regeneration, even if the process of disgorgement went so far as to leave but an empty sac behind. Considering the facility with which the Sea-Cucumber separates itself from its digestive organs, it is the more to be wondered how it tolerates the presence of a very remarkable parasite, a fish belonging to the genus *Fierasfer*, and about six inches long. This most impudent and intrusive comrade enters the mouth of the Cucumber, and, as the stomach is too small for his reception, tears its sides, quartering himself without ceremony between the viscera and the outer skin. The reason for choosing this strange abode is yet an enigma.—*Dr. Hartwig's "Sea and its Living Wonders."*

BITTERN IN NORFOLK.—I have to record the death of a fine female specimen of the Bittern (*Ardea stellaris*), which was shot at Barton Turf, Norfolk, on April 2nd. This is the second instance, within the last six months, in which this bird, which is becoming gradually so rare in England, has been shot at this place. Although no ornithologist myself, I am inclined to think that this bird, if it had not been shot, would probably have nested somewhere in the neighbourhood. I have to make one further remark, which is, that the present Government would provide better for the preservation of rare birds, if they imposed the ordinary game license on every one who carried a gun instead of a tax of £1.—*R. I.*

OTTERS.—I copy the following from the *West Briton*, of April 14th. Otters are frequently found swimming in and around Penberth Cove, near the Logan Rock, Cornwall, and when nets are placed across the cove, the cunning otter visits the meshes, and helps himself to whatever is entangled. This is deemed poaching and punished accordingly. The other day the remains of a fine salmon were found on a rock which abuts on the cove, so a watch was kept, and the next otter that robbed the nets and made for land with a fish in his mouth was shot.—*H. Budge.*

COUCH'S BRITISH FISHES.—The author of this excellent work, Mr. Jonathan Couch, F.L.S., F.Z.S., has lately died at Polperro. His loss will be much regretted by all British naturalists, and especially those addicted to fish-lore.

LIST OF BRITISH INSECTS.—We are glad to see that the Entomological Society of London purpose to publish a general catalogue of the insects of the British isles. In pursuance of this purpose a catalogue of Neuroptera has just appeared. It is enough to state that it is edited by R. McLachlan, F.L.S., to ensure confidence in its accuracy, that gentleman having a reputation in this branch of Entomology throughout Europe, and wherever English books are read. The synonymy is copious, and we hope that other portions, including other orders, will soon follow. Meanwhile we commend this portion to our readers, in the hope that they will encourage the Entomological Society to proceed, by spending a shilling for the good of British Entomology, whether interested in this special branch or not.

LIMNEA PEREGRINA.—In a small spring that breaks out on the road-side, on one of our hills here, and forms a puddle, with perhaps two or three gallons of water in it, I found about half a dozen fine full-grown *L. peregrina*. This puddle froze solid in the hard frost this winter, and it is a good illustration of the hardness of this species, which, curiously enough, is not found in several much more favourable situations in the same neighbourhood.—*Harry C. Leslie, Erith.*

STICKLEBACK.—I have had a fresh-water Stickleback (*Gasterosteus aculeatus*) living for several weeks in a marine aquarium, in company with a few small anemones and mussels. He appears very comfortable.—*Henry Ulyett.*

SMEW (*Mergus albellus*).—I may state that, in answer to the query of "J. R." as to the occurrence of *Mergus albellus* in the south of England, I have seen many specimens shot by myself and others, all of them young males and females, the time of arrival being about the month of January, on the river Isis. It is rather difficult to determine the sex of the above up to the second year, as the plumage in both is very much alike.—*W. C.*



GOLDEN ORIOLE : *Oriolus galbula*.—I saw a full-coloured male of this species, April 21st, in the fields near Folkestone. I am happy in the belief that it has escaped the snare of the fowler as yet, though I saw the birdcatchers after it.—*Henry Ulyett*.

EARLY MOTHS.—Amongst my captures last month were *Ligdia adustata*, taken plentifully at Wargrave-on-Thames, on the 23rd and 25th of April, and *Chesias obliquarea*, taken here on the 19th and 20th of April, also one found in the house on 10th of the same month. Stainton's "Manual," and Newman's "Moths," give June and July for the time of appearance of *L. adustata*, and the middle of May to August for *C. obliquarea*, so it is possible that these may belong to earlier broods, overlooked hitherto, especially as this is by no means an early season.—*Harry C. Leslie, Erith*.

NEW SHELLS.—It will doubtless be interesting to the conchological readers of SCIENCE-GOSSIP to know that two new British species of shells may be added to our present number. One is a fresh-water species, which I found in the canals near Manchester, about twelve months ago; and after being examined by Mr. Gwyn Jeffreys, he found it to be identical with the *Planorbis dilatatus* (Gould), a North American species. The query to solve is, how it has been introduced into this country? Mr. Jeffreys and myself think it is by means of American cotton, as both its habitats in the canals are close to the cleaning or blowing-room of the cotton-mills. This view of the matter is however questioned by Mr. J. G. Anthony, one of the best American authorities, who informs Mr. Jeffreys that it is not a shell that is found in the cotton-growing States. I still, however, think that the incidents and vicissitudes which "King Cotton" met with, and was put through during the late American war, may have something to do with the matter. For description of shell and its inhabitant, I cannot do better than give you the article which was written by Mr. Jeffreys in the "Annals of Natural History" for November last. The other new shell is a land shell, belonging to the genus *Zonites*, which for general appearance may be said to be intermediate between *Z. cellarius*, and *Z. alliarius*, but sufficiently distinct to be easily told from either species, especially so when collected of mature growth. Its identity with the *Zonites glaber* (Studer), a continental species, is entirely due to the extensive knowledge of Mr. Jeffreys. I also send you Mr. Jeffreys' description of the shell. I should also be glad to exchange the *Planorbis* and *Zonites*, as far as I can, for other rarer shells British or foreign.—*Thos. Rogers*.

SPRING VISITORS.—The 1st of May brought us the Cuckoo and the Landrail, and the 3rd of the same month favoured us with the Chimney Swallow,

although several days before this I was fortunate to meet with the Blackcap and White-throat, which leave us in the winter months the same as the ones mentioned above. My gooseberry bushes have been literally swarming with the caterpillar of the Magpie Moth. Although I was grieved to see them, yet they gave me a good deal of amusement, as they would drop from the branches as soon as they perceived their danger, and swing in the air with a fine thread "ready spun for the purpose," and then try to regain their home. As I have not seen the moth as yet, will these eggs have been subject to the winter months?—*John Sim, West Cramlington*.

OTTERS.—On the 27th of April a large dog otter, weighing twenty pounds, was killed in a wood on the banks of a stream near Peover Hall, Cheshire, by the Hon. G. Hill and his otter hounds. A friend mentions in a letter that the same hounds hunted at Chebsey, Staffordshire, on the 30th of April, where they found two otters and killed one.—*G. H. H.*

SEA-GULLS.—On the afternoon of May the 5th, whilst walking along the Malvern Hills, just after leaving the summit of the Worcestershire Beacon, 1,396 feet above the sea, and the highest of the whole range, I observed three sea-gulls flying at a considerable height overhead. They hovered about for several minutes, and then flew off in a northerly direction. The appearance of this bird so far inland is not of common occurrence, and when it is seen at a distance from the sea it is a sign of stormy weather. I may mention that the 5th was a splendidly fine day, and it continued so till the 11th, when wind and rain at last commenced, after an unusually dry season.—*A. E. B., West Malvern*.

CUCKOO.—I have perused with much interest the paper on the Cuckoo in your last issue, written by Mr. J. E. Harting, especially that portion bearing on the colour of the eggs laid by that erratic bird. All the examples which have fallen under my personal notice were pretty nearly of the same colour, and I have found them in the nests of several birds. The first egg I ever saw was in the nest of a blackbird; but the majority I found in the nests of the Titlark and the Hedge Sparrow. There is at present in the possession of the coachman at Brayton Hall, the seat of Sir Wilfrid Lawson, Bart., M.P., a nest of young throstles of the present season, containing four young birds, one of which is of a pure snowy-white colour, and, like most other albinos, has pink eyes. How is this fact reconcilable with some of the views set forth in Mr. Harting's paper; and why should one bird alone be marked by such a peculiar deficiency of colouring in its plumage, when its brethren all wear the mottled breasts and brown backs of their congeners?—*W. H.*



## BOTANY.

RARE PLANTS AT TORQUAY.—Under the above title I wrote a description of two plants I found near Torquay last Christmas-day, one of which, in the excitement of enthusiasm, I declared to be the early growth of *Adiantum reniforme*. A day or two after the February number of SCIENCE-GOSSIP appeared, I was applied to by no less than four correspondents for spare fronds of my fern. One of my correspondents, I regret to say, convinced me of my mistake, and I take this opportunity not only of admitting my error, but of informing the readers of SCIENCE-GOSSIP that I visited the rocky cave in which I found my supposed *Adiantum* on Easter Monday, and I was delighted to find the fern still growing, although it had scarcely increased in size. I was surprised to find the tiny fronds still simple and reniform; however, there can be no doubt that my fern is nothing more than a stunted or immature form of *Asplenium Ruta-muraria*, but how it got into such an out-of-the-way place, its usual habitat being old walls, is a puzzle, especially as it was the only specimen of the species I met with during either of my visits to the neighbourhood. Primroses, which are so fine and abundant on the hedge-banks, coppices, and hill-sides in Devonshire, occasionally present flowers having six petals, but during my Easter visit to Torquay, I had the gratification of meeting with a solitary flower having *eight* petals. This surely must be a rarity, at least it is the first time I ever met with a primrose with more than six petals on a *single* flower, and its discovery was naturally very interesting.—*W. H. Grattann.*

TRICOTYLEDONOUS EMBRYOS.—Irregularities in the number and arrangement of the cotyledons are not uncommon in young sycamores. I have lately collected all that I could find with a view to the solution of the question raised by Mr. Kitchener. I have found one or more examples of each of the following variations:—I. Cotyledons united for about half their length, the plumule being embraced by the edges of the single compound cotyledon in the same manner as the spike of the Adder's-tongue (*Ophioglossum*) is by its leaf. II. One cotyledon normal, the other slightly cleft at the apex. III. Three cotyledons, two of which are more or less united at the base and opposite to the third. This is by far the most common variation. IV. Three distinct cotyledons, equidistant from each other. In this case, the plumule usually consists of three leaves in a whorl alternate with the cotyledons, the petioles of two of these leaves being, in one instance which I have found, fused together. V. Four distinct cotyledons. I cannot find any instance of the stalk being grooved or flattened, either above or below the cotyledons, or any trace of an abortive plumule, such as might

be expected 'in the case of a double monstrosity. This circumstance, as well as the greater abundance of specimens in which two of the three cotyledons are united at the base, would, I think, lead us to consider the variation to be caused by a chorisis of a cotyledon, while the existence of specimens with three cotyledons and three second leaves would be rather in favour of the view proposed by Mr. Kitchener. The difference between these two views will not appear very great, if we consider that the cotyledons and plumule are formed by the division of a single cellular mass. In the one case, we should assume that this mass divides into a central, and three, instead of two, lateral masses; in the other, that having divided as usual into a central and two lateral masses, one or both of these are cleft at an earlier or later period of their growth, and the result is a more or less deeply divided cotyledon, or in some cases two entirely distinct from each other.—*F. V. Paxton, M.B., Chichester.*

TRICOTYLEDONOUS EMBRYO.—(See May No.) Your correspondent's tricotyledonous embryo was not necessarily produced by chorisis. There may have been *ab origine* three cotyledons. Such an augmentation in number does occasionally occur, though the appearance in question is more frequently due to a fission, or subdivision, of one of the two cotyledons. It has been stated that Pinks possessing this peculiarity will produce double flowers, but this is a statement requiring confirmation. Your correspondent will find an illustration of the union of two embryos (Synophy) in A. P. De Candolle, "Organogr. Végét.," tom. ii. p. 27, tab. 54; *ibid.* t. 53. Other references will be found in Masters's "Vegetable Teratology," pp. 57 and 370.—*M. X.*

APIUM GRAVEOLENS, *Poisonous*.—A parishioner lost a fine cow, from her eating the roots of this plant, which he dug up when clearing a ditch, having thrown up the roots on the bank. The leaves are considered innocuous. Two children were also poisoned some years since by eating the roots which were thrown up on the sea-shore. The common belief with the peasantry is, if anything is poisoned with this plant, it grows out of the graves.—*S. W. Brennan, Cushendur, Co. Antrim.*

BRITISH AGARICS.—In the *Journal of Botany* for April, Mr. W. G. Smith, F.L.S., gives an analytical key to the genera and sub-genera of *Agaricini*, with illustrated plates, and observations. This communication is useful towards simplifying the study of this somewhat difficult order of fungi, and should be widely circulated.

SUSSEX MOSSES.—All who are interested in the mosses to be found within a reasonable distance of London should obtain Mr. C. P. Smith's "Moss Flora of Sussex," just published by the Brighton and Sussex Natural History Society.



## MICROSCOPY.

SCALE OF TENCH.—The scale of this sullen fish (*Tinca vulgaris*) is of such a marked character, and differs so essentially from those of other fresh-water fishes, already figured in this journal, that our readers will lose no opportunity of adding such a

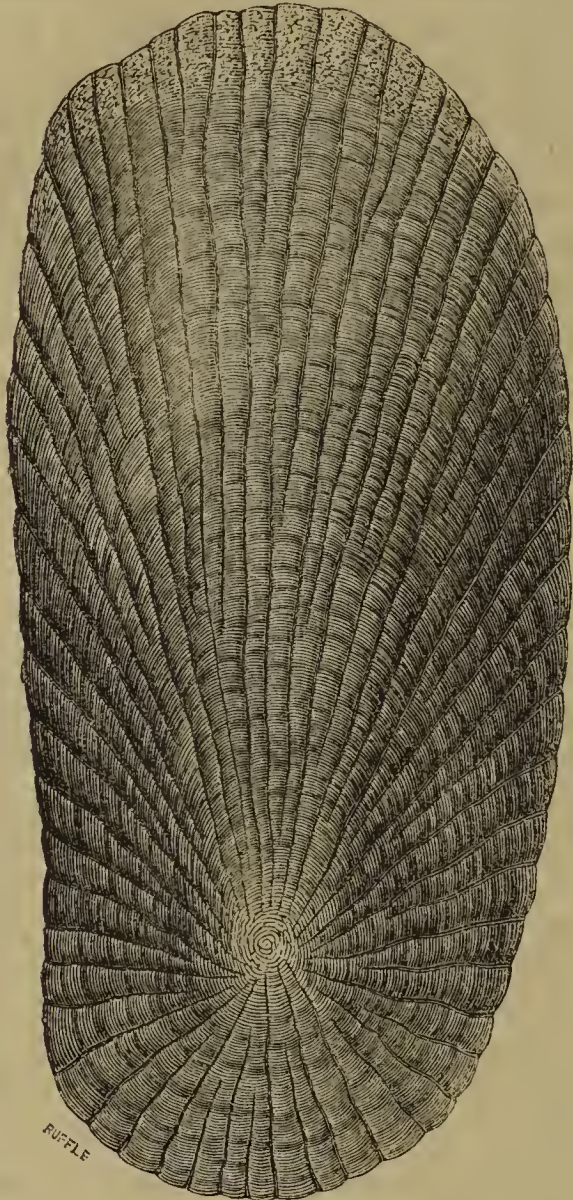


fig. 131. Scale of Tench.

slide to their collections. Generally this scale is absent from cabinets, as though it had no character of its own; but our figure will, we hope, redeem the Tench, and its scales, from any such imputation. It is magnified to the same extent as former examples.

HOW TO PREPARE YOUNG OYSTERS FOR THE MICROSCOPE.—Acting on the principle I always advocate, that there should be no secrets in science, I feel much pleasure in offering to “W. J. B.” the information he desires respecting the method of cleaning the shells of young oysters. It is not improbable that those of which he expresses approbation passed through my hands, for I presented some time ago a quantity of them to one of our leading opticians, who has them mounted as he requires them for sale. Having found a “black-sick” oyster (to use the dredgermen’s term), the spawn of which is quite mature and ready for extrusion, pour off from the shell the dark slate-coloured fluid into a long narrow two-ounce phial; fill up the bottle with *distilled* water; shake it up gently; allow the deposit to settle, and change the water two or three

times, repeating the agitation to get rid of the salt. Then substitute for the water *liquor potassæ*, diluted with an equal quantity of distilled water. Allow the young oysters to remain in this for two days, agitating occasionally; and, as often as the solution becomes discoloured, pour it off, and renew the same until no colour is given off and the shells are seen to be thoroughly cleansed from all animal matter, by their sinking freely and rapidly to the bottom. When this stage is arrived at, stop the process, that the two valves of the shells may not be separated by the destruction of the hinge. Wash *repeatedly* in distilled water, to remove all trace of the alkali, and finally wash and preserve the shells in a little rectified spirits of wine (not methylated spirit). When they are to be mounted for the microscope, shake them up with the small quantity of spirit; and, before they settle, dip in a fine camel-hair brush, and deposit its contents on the slide. If too much spirit has not been added to them, there will be just enough of the shells in the brush to make a nice object. They show better when not huddled together too thickly. If undistilled water or methylated spirit be used, instead of being brilliant and clean, the shells will probably have the milky and semi-opaque appearance which is so objectionable. As each oyster produces on an average eight hundred thousand young ones, the spawn of one parent will be sufficient for almost any number of slides. It is worthy of notice that, in its early condition, the oyster has both valves equally convex. This process is equally applicable to the bleaching and preparation of starfishes.—*Henry Lee*.

NOTE ON DIATOMS.—While examining the linear fronds of the common *Ulva* (*U. elongata*), my attention was directed to an indistinct bundle of motion far down in the depths of the surrounding water. I removed the half-inch objective in use, and substituted the quarter-inch, when I immediately recognized that marvel of anomalies, the *Bacillaria paradoxa*. I should think the specimen (if I may so term it) was unusually large and perfect. In shape I can compare it to nothing better than a “villus” of the human intestinal membrane covered with minute spines, while the inexplicable never-ceasing motion of the numberless frustules put me in mind of a quantity of small, short needles, thrown carelessly together, and irregularly agitated by changing the poles of a battery in connection. In fact the presence of electric currents as affecting the arrangement of the frustules seemed more than probable, for when a portion of the bacillaria occasionally separated and gradually spread out into a projecting limb, the frustules invariably returned to their normal position by an end-to-end-like motion, one over the other, as if alternately attracted and repelled by chemical currents.—*Walter B. Cole, Weymouth*.



## NOTES AND QUERIES.

**THE FIELDFARE.**—In Gloucestershire and Somerset this bird is called "Vildévierd." The name being pronounced as a word of three syllables, the letter *v* taking the place of *f*, in the popular pronunciation in the above counties.—*W. H. Grattann.*

**STRANGE BEES.**—A relation of mine, who is a great bee-fancier, but no entomologist, particularly wishes for information about a species of Bee, of which he noticed a great number in his garden last August. They were very busy about the small blue lobelias, at that time in blossom. In form, size, colour, and mode of flight, they so exactly resembled the Hive Bee (*Apis mellifica*), that an ordinary observer would have detected no difference; but closer attention showed a tuft of short pale yellow hair between the eyes, in front, giving a peculiar aspect to the head. At first it was thought that this peculiarity was due to the insect having inserted its head among the pollen of some flower; but when the same mark was detected in a number of individuals, it became evident that these could not be Hive Bees, but of an entirely distinct species. On very close inspection it might perhaps be thought that the body was a trifle fuller, and rounder than that of the common Bee; but the difference was so slight that it was almost doubtful. Five or six of these curious insects might be seen at once in a small space of ground; but it could never be ascertained whence they came. Perhaps one of your numerous readers could give the desired information.—*A. W.*

**UNWELCOME GUEST.**—In an aquarium of mine, containing *Valisneria spiralis*, a few gold fish, and trumpet snails, a green film (I presume a sort of alga) has grown lately on the *Valisneria*, projecting quite a quarter of an inch from the leaves from all sides, giving the aquarium a green and stagnant appearance; whereas for some years it has always been perfectly clear and transparent. Will some kind friend inform me how to get rid of the unwelcome guest?—*C. L. C.*

**KILLING APHIDES.**—Hot water may be employed for the destruction of the insects that most commonly infest plants. The few experiments made have been attended with such promising results that we shall hope to find opportunity soon for repeating them in a more extended and systematic manner. For the present we shall speak of aphids only, and as that is the most prevalent of plant-pests, we trust these remarks will be useful to many readers. It appears, then, that aphides quickly perish if immersed in water heated to 120° Fahr. We obtained from various sources plants infested with green-fly, and cleansed them all by the simple process of dipping. As the experiments were made in the month of February, we thought it probable that aphids might endure in June a temperature many degrees higher than that which proved fatal to them in the earlier and colder season. Hence it became desirable to ascertain the degree of heat the plant could endure in the dipping process. A number of herbaceous and soft-wooded plants were therefore subjected to the process of immersion in water heated to various degrees above 120°. We found that fuchsias were unharmed at 140°, but at 150° the young leaves were slightly injured. Calceolarias suffered at 140°, but the plants were not killed, though their soft tops perished. Pelargoniums were unhurt up to 150°, but the slightest rise beyond that

figure killed the soft wood and the young leaves completely. Chinese primulas were injured by any rise beyond 140°, and this at last proved to be the most general maximum, and may be cited as a rule for observance. Centaureas, sedums, saxifragas, thysacanthus, justicias, ferns, heliotropes, petunias, begonias, mignonette, and many other plants of soft texture, were unhurt by being dipped in water at 140°, but the slightest rise beyond that point was followed by blackening of the leaves, and consequent disfigurement of the plant, and at 150° the process of killing commenced.—*The Gardeners' Magazine.*

**TOAD AND WASP.**—In answer to Mr. Guyon's letter in last month's SCIENCE-GOSSIP, with regard to the question as to whether toads will or will not eat bees or other stinging Hymenoptera, and if they do, whether injury is the consequence to the reptiles, I may mention that I tried the experiment a few days ago. Having caught one of my toads I placed him under a glass shade, having previously inserted a large wasp. For some time neither one nor the other stirred; suddenly, however, Bufo turned round and darted out his tongue, caught the wasp, and having all but swallowed him, to my astonishment—for I believed him to be fairly down—spat him out. After this I frequently tried him again, shutting them up together for a long time; but the toad would have nothing more to say to the wasp, and appeared to grow even frightened and sulky. I therefore thought it useless to continue the experiment. Whether or no he received a sting in the tussle I cannot say.—*J. S. William Durham.*

**PAIGLE.**—Can "R. T., M. A.," or any other contributor, explain the meaning or derivation of this, the popular name for *Primula veris*? To prevent an unnecessary amount of space being occupied by discussion on the matter, I will briefly enumerate the various derivations which have already appeared in print. From the French *épingle*; from "*prata*, meadows, where it delighteth to grow" (Forster), "*Perennial Calendar*;" from A.-S., *paell*, a dye-plant (Forinby); from the word *speckle*, in allusion to its cinq-spotted corolla, a corruption of the old name *herba paralyesos*; or of its "M. Lat. name of *verbasculum*, with a change of *b* to *p*, and omission of *s* (Prior); or from the A.-S. words *beah*, a garland, and *gelde*, golden. I am not satisfied with any of these; and Dr. Prior, remarking that it is "a word of extremely obscure and disputed origin," leaves it unexplained. In connection with the name we may remember that in some of the eastern counties it is still applied to the various *Ranunculi*, known as buttercups, and has been thus applied as far back as the time of Ray; and Gerard applies a similar one—Pygie or Pagle—to the Great Stitchwort (*Stellaria Holostea*). "*Pagil*" appears to be the spelling most usually adopted in the older books; and "*Peggle*" is the pronunciation at the present day. Can any one state the origin and meaning of Cowslip, the other popular name of *P. veris*?—*James Britten.*

**BEES.**—I should feel extremely obliged if any of the bee-keeping readers of SCIENCE-GOSSIP would inform me if using zinc troughs to feed bees is injurious to them, and whether the zinc has any chemical effect upon the syrup, which would be likely to poison and destroy the bees—as I fed two hives in the above manner last autumn, the inhabitants of both of which have died this month, having plenty of meat left in the hives.—*E. S.*



NIGHTINGALES.—In March several letters were inserted in the *Times*, recording the early appearance amongst us this season of the Nightingale in some parts of the country. I desire to draw attention to the earliest appearance I am acquainted with, that of the Nightingale heard by Cowper on New Year's Day, 1792. The poet thus commences:—

“Whence is it that, amazed, I hear,  
From yonder wither'd spray,  
This foremost morn of all the year,  
The melody of May?”

After all, was it a nightingale that the poet heard?—*R. T., M.A.*

BEES.—Having frequently noticed that one side of a certain sandbank, about six feet in height, surmounted by a thick hedge, was in many places drilled with a number of holes about half an inch in diameter, without being able to account for them to my satisfaction, I was not a little surprised the other day, on walking through the field bordered by this bank, to see several bees, which, on examination proved to be of the solitary species, entering these holes; but two bees never by any means entered the same aperture. Upon more minute observation, I found that none of these passages exceeded three inches in length, and that there was no communication whatever between any two of them. Yet some of them were drilled so close together that there was nothing but a thin wall to separate one passage from another. Exactly fitting into the bottoms of several of these small burrows, which for the most part curved downwards, was a small shell-like cup, corresponding in shape and size to an acorn-cup, which was in some cases empty, but generally contained a yellowish semi-solid, which, although in very small quantities, possessed a most filthy effluvium. No cells of any kind were visible, and I am quite certain that no two bees ever entered the same hole. In another part of the bank I found that most of these “bee-burrows” contained the dead body of a bee entirely incased in a crumbling shell, which appeared to be of the same substance as the above-mentioned cup-like structures, only, instead of being merely as large as the acorn-cup, it was increased to the size and shape of the acorn *itself*. These corpses had evidently been interred in their curious coffins for a year or more, as many of them, on being exposed to the air, crumbled away. The cases themselves were very brittle, and often very imperfect. Can you give a satisfactory explanation of these curious facts? If these bees really made these holes for their habitation, it would seem that they lived entirely upon plunder, like the solitary wasps, since there was no room in any of their passages for cells; and, laying up no store, perished in coffins of their own manufacture as winter closed in. But then, how and where do they rear their young?—*H. D. W., Isleworth.*

IS IT A BEE?—I discovered a short time since in the flower-garden, some little creatures apparently of the Bee species, which had burrowed their way to the surface from some depth, and had thrown up small mounds of earth. The animal was somewhat smaller than the Honey Bee, and certainly was not the large “Humble Bee” I have been accustomed to see in old banks, &c. Can you name the species, and state whether common?—*H. N. Oscott.*

TOADS EATING BEES.—As bearing on your correspondent's inquiries on the above subject, allow me to state, that I once took thirty-two whole bees (dead, but apparently otherwise none the worse for

their incarceration), from the stomach of a large fat toad, which dwelt “in a hole” beneath a neighbour's bee-hive; besides the thirty-two bees, the stomach contained a black plastic mass, as large as a walnut, clearly consisting of half-digested bees and beetles. Now, although I cannot lay claim to having seen the toad take any one of his victims, yet, as toads are said to take none but moving prey, it may be concluded, from the above facts, that toads eat bees alive, and while capable of using their stings.—*W. le W.*

SPIRAL VESSELS.—As your correspondent “W. J. B.” wishes information respecting plants containing large quantities of spiral vessels, I may state the largest quantity I have ever met with were obtained from the *Musa textilis*. They were sent me from the West Indies, where they were used as tinder. I enclose a small quantity.—*W. T. Iliff, Epsom.*

AQUARIUM.—Can you or any of your correspondents tell me how to get the *Confervæ* off the front of an aquarium? I have had it “in work” for nearly three years without change of water, but owing to press of business, have been unable to sponge the front for some little time, and now I cannot get it clear. I have tried sand and hard rubbing, but all to no purpose.—*J. G. Odell.*

[Probably it is too much exposed to the light, and there are not sufficient snails (*Planorbis*) in the aquarium to keep down the growth of *Confervæ*.]

TAMPICO JALAP.—In the Journal of the Linnean Society for May, Mr. Daniel Hanbury describes and figures *Ipomæa simulans* as the source of the above-named drug.

THROBBING-STONES.—I should be much gratified if any learned correspondent could name any actual cases of stones that vibrate to one, and only one, note sounded near them, as alluded to by Mr. R. Browning, in his glorious poem of *Sordello*, book ii., l. 450 to 459.

“Like some huge throbbing-stone that, poised a-joint,  
Sounds, to affect on its basaltic bed,  
Must sue, in just one accent,” &c.

As Mr. Browning is the most accurate of all poets, past and present, in his scientific allusions, I can hardly believe he is wholly following a popular imagination in this case.—*J. Kirkman, Hampstead.*

STIGMAS (?) OF CONIFERS.—In a well-known little work by W. S. Coleman, “Our Woodlands, Heaths, and Hedges,” I read the following in the botanical description of the Pine genus:—“Pericarps attached to the inside of scale, more or less winged; deciduous; stigmas, bifid or trifid.” And, again, of the Larch:—“Stigma hemispherical, cupped, glandular.” As I have hitherto understood the *N. O. Pinaceæ* to be distinguished by their naked ovules, “without ovary, style, stigma, or pericarp,” I should be glad of an explanation of the above.—*R. Curtis, 15, Cumberland Place, Bayswater.*

[*N. O. PINACEÆ*.—“Ovary spread open and having the appearance of a flat scale, destitute of style or stigma, and arising from the axil of a membranous bract.”—*Lindley's Veg. King.*, p. 226.]

PRIMULA FARINOSA.—In reply to the queries of *R. T., M. A.*, in your May number, respecting the time of flowering of the above pretty wild flower, which has been an especial favourite with me from



boyhood, I may state that its general time of flowering in Cumberland is from the middle to the end of May. A few spikes may be found in blossom now, and in a week or ten days hence they will be in perfection. The overblown plants referred to by your correspondent had in all probability bloomed in the earlier part of the same season. I think it is unusual to meet with specimens of the plant flowering so late as September. As a boy I made repeated efforts to introduce the plant into a little flower-bed at home, which was allotted for my special use, but my experiments signally failed. I succeeded, indeed, in keeping most of my "subjects" alive, but their healthy brilliancy of colour fell far short of the plants which blossomed in the boggy meadows of the adjoining farm.—*W. H.*

**SCAVENGER BEETLES.**—Scavenger beetles are to be seen wherever the presence of putrescent and offensive matter affords opportunity for the display of their repulsive but most curious instincts; fastening on it with eagerness, severing it into lumps proportionate to their strength, and rolling it along in search of some place sufficiently soft in which to bury it, after having deposited their eggs in the centre. I had frequent opportunities, especially in traversing the sandy jungles in the level plains to the north of the island, of observing the unfailing appearance of these creatures instantly on the dropping of horse-dung, or any other substance suitable for their purpose; although not one was visible but a moment before. Their approach on the wing is announced by a loud and joyous booming sound, as they dash in rapid circles in search of the desired object, led by their sense of smell, and evidently little assisted by the eye in shaping their course towards it. In these excursions they exhibit a strength of wing and sustained power of flight, such as is possessed by no other class of beetles with which I am acquainted, but which is obviously indispensable for the due performance of the useful functions they discharge.—*Sir J. E. Tennent's Natural History of Ceylon.*

**DEATH'S-HEAD IN A BEE-HIVE.**—It has been often stated that the Death's-head Moth' (*A. atropos*), creeps into the bee-hives and robs them with impunity; but a circumstance which came under my own observation leads me to hold an opposite view; namely, that the moth has no wonderful power of rendering the bees powerless by means of its shrill cry. I will relate what happened. Last autumn I was preparing to drive some bees located in a common straw hive, and on raising it from the floor-board just by the entrance, I found a very fine and perfect specimen of the Death's-head; the insect was quite fresh, and looked as though it had been killed in the most careful manner possible. I took possession of it, and it now figures amongst my other Lepidoptera. I of course held a "coroner's inquest," and the verdict was "that the moth had crept into the hive, and had been despatched by the stings of the bees." The very perfect and fresh condition quite forbids the theory that it had crept in there to die on account of old age. Neither could it have been long in the hive, as the bees would quickly set to work to get rid of such an obstruction as a "Death's-head Moth." I should be glad to know if anything of the kind has been noticed before.—*D. D. B., Cantab.*

**FIRE.**—What has fire done upon the earth? Fire has only reconstructed and destroyed. Nothing

has found an origin in fire. Fire itself is an effect, and not a cause; it is in the atmosphere, it is in the flint in the earth, it is in the water—in each it is a thing by itself, unseen or unfelt, certain conditions bring it into active existence, but it cannot be traced in either element as a matter of course; yet it is here, there, and everywhere; it has built up Cotopaxi to the height of 18,000 feet; Teneriffe has been shot up by its labours from an unknown depth beneath the sea to 12,000 feet above it; Etna is heaped up with lava, ashes, and scorice some 11,000 feet; Iceland has grown into a great island under its influence; and Vesuvius has grown to a height of 3,751 feet, from a reconstruction of earthly matter by force. Well may man, in his narrow chamber, have thought that all this, and much more, was far beyond the labour of local forces; and naturally has he put it down to one great internal and eternal cause; but, as he steps out of that chamber, and sees nature through the uncounted ages always at work upon the one great labour I have endeavoured to describe, I do not think that many will hesitate to accept my interpretation of volcanic phenomena.—*Malet's Interior of the Earth.*

**BEES.**—A gentleman living in this neighbourhood had one hive of bees very healthy, and one morning he perceived a great commotion in the hive, and when he looked closer, he noticed some strange bees fighting with his own; the strangers eventually conquered, stole the honey and left the owners dead on the field. The stranger bees were of light colour, the others dark and glossy. Does this often happen? And is there any way of preventing it?—*E. D. Bell.*

## WHO'D BE A BUTTERFLY?

### *A New Version.*

Who'd be a butterfly? Not I for one!  
Chased by each idle young son of a gun,  
Damaged by many a slap and a rap  
From tatterdemalion's unmannerly cap!  
Who'd be a butterfly? Who, I say, who?  
Not I, for one! For another, not you!

Caught by rude hands, whose brute-owner presumes  
Fingers don't damage your delicate plumes;  
Rubbed with rough touches till powerless to fly,  
Then loosed, to flutter away—and to die!  
Who'd be a butterfly? Who, I say, who?  
Not I, for one! For another, not you!

Who'd be a butterfly? E'en at the best,  
Prey of some keen entomologist's quest,  
Pierced with a pin, and with pinions displayed,  
Safely away in a cabinet laid!  
Who'd be a butterfly? Who, I say, who?  
Not I, for one! For another, not you!

Ah, brother-butterflies—two-legged, I mean;  
From these poor insects what morals we glean:  
Do not the faults which the angels deplore  
Soil our bright wings till they sink—and not soar!  
Who'd be a butterfly? Who, I say, who?  
I am, for one! For another, are you!

E'en at the best, we have butterfly-fame,  
Pinned in a case with a label and name:—  
Gazed at with pride for a week—or a day—  
Then in dark cabinet huddled away!  
Who'd be a butterfly? Who, I say, who?  
Well, I'm afraid, my good friend,—I and you  
*Fun.*



## NOTICES TO CORRESPONDENTS.

C. E. M.—Why not read the previous correspondence on the subject before writing about it?

J. A., J. P.—Please to read the notice at the head of "Exchange" column. If our instructions are not regarded, we shall reluctantly be compelled to exclude all "Exchanges" not in proper form. It is a careless habit not to write generic names in full, against which we constantly protest.

M. S. W.—Only the natural stalked glands of the leaf.

J. E.—Contributions may be considered as declined if they do not appear within two or three months.

W. H. J.—*Puccinia Betonicæ*.

W. B. F.—We do not think that they exceed 30 inches in expanse, usually less.

J. H.—The fly is *Bombylius medius*, L.; order Diptera; family Bombylides. It is analogous to the humming-bird in its flight, and in its habit of sucking flowers while on the wing.—F. W.

E. W.—Probably the common larch, but there is not sufficient evidence to decide.

T. S. W.—Cooke's "Manual of Structural Botany" (Hardwicke); Stark's "British Mosses" (Routledge); Page's "Handbook of Geology."

J. S.—They are not so thin as they should be to make good slides.

R. R.—We certainly *do* object to name two or three mosses for the same person month after month; and we cannot attempt to name any without fruit, which is the condition of all three of your specimens.

E. W.—The male fern *Lastrea filix-mas*. Clean fish-scales by well washing, and mount dry or in balsam.

J. B. R.—A species of *Lepisma*, probably *L. saccharina*.

S. A. B.—We do not attempt to name ferns from barren fronds.

H. N. O.—The "vinegar plant" is the mycelium of a fungus, which, when perfect, is *Penicillium crustaceum*. The "Balsam Poplar" is *Populus balsamifera*, natural order *Salicaceæ*.

J. F. seriously inquires if any one can send him the root of the "Mandrake"; as the omnibus conductor says: "Will any gentleman oblige a lady?"

A. J. M. A.—You should first have consulted a book on British birds, such as Macgillivray's or Yarrell's. We do not profess to illustrate the common habits of animals which have been written about over and over again.

H. W. G.—*Aulacomnium androgynum*.—R. B.

J. C. D.—No. 1. *Anomodon viticulosus*. 2. *Hypnum velutinum*.—R. B.

J. C.—No. 1. *Mnium hornum*. 2. *Dicranum scoparium*.—R. B.

W. L. W. E.—*Hypnum glareosum*.

R. A.—Nos. 1 & 2. *Tortula unguiculata*.—R. B.

S. A. S.—*Racomitrium Sudeticum*. The leaf points are hoary. Will you kindly send a little more?—R. B.

A. J.—No. 1.—*Timnia Norvegica*, Zetterstedt; regarded as a variety of *T. megapolitana*. 2. *Hypnum piliferum*. Please to forward a few more specimens of No. 1, and the locality.—R. B.

E. C. J.—No. 1. *Arthronia astroidea*, Ach.—W. C.

## EXCHANGES.

NOTICE.—Only one "Exchange" can be inserted at a time by the same individual. The maximum length (except for correspondents not residing in Great Britain) is *three* lines. Only objects of Natural History permitted. Notices must be legibly written, *in full*, as intended to be inserted.

ONE HUNDRED SPECIMENS of Sikkim-Himalaya Ferns (dried) in exchange for others from distant countries, not excepting British Ferns.—The Vicar of East Winch, Lynn, Norfolk.

*A. atropos*, *D. vinulu* and other Lepidoptera for Sesin.—John Purdue Ridgeway, Plympton, Devon.

SCALES OF PODURA and *Polyommatus Argiolus* (well mounted) for a transparent Coal Section (well mounted).—H. Durnford, Claremont House, Waterloo, Liverpool.

HAIR of Monkey, Lion, Kangaroo, Leopard, and others (unmounted), for objects (mounted or unmounted).—E. Wilson, 82, Southampton Road, Hampstead, N.W.

GRAYLING SCALES.—Send stamped and directed envelope to R. Murray, 13, James Street, Mile End, Glasgow.

EGGS of Long-eared Owl, Storm Petrel, &c., for other equally good British Eggs.—Address, Mrs. Battersby, Cromlyn Rathowen, West Meath, Ireland.

SPICULES of *Spongilla fluviatilis* and *lacustris* (mounted) for injections or other objects.—J. W. Newman, 165, Moxey Road, Plumstead.

WANTED.—*Hyale* and white variety of *Edusa*, in exchange for other butterflies.—Address, J. Anderson, Jun., Alresford, Hants.

WANTED.—*Pamphila Actæon*, and *Thecla Betulæ* and *Pruin* for other local species.—Address, Miss Scriven, Castle Ashby, Northampton.

BRITISH MOSSES, &c.—*Tortula ambigua*, *Bartramia pomiformis*, *Webera carneu*, and other mosses, in exchange for other mosses or rare flowering plants.—A. French, 15, Cherwell Street, Banbury, Oxon.

RICH FORAMINIFEROUS EARTH, containing many species now being figured, in exchange for good mounted objects.—R. Burrow, High Street, Brunswick Road, Norwich.

SHELLS.—A series of Foreign Gasteropods, &c., for exchange.—Send lists to T. G. P., Institution, Park Street, Bristol.

WANTED, Shell Scrapings and Deep-sea Dredgings, containing Diatomaceæ, in exchange for good recent gatherings of these objects.—B. Taylor, Hon. Sec. Whitehaven Scientific Association.

LARVA and Pupa of *Potatoria*, in exchange for Pupa or Imagos of any of the *Rhopalocera*. Communications answered within a few days, if still open for exchange.—David Pringle, Ellison Villas, Mount Pleasant, Gateshead-on-Tyne.

EGGS of THE WOOD WREN wanted in exchange for British or Foreign Land Shells.—C. Ashford, Grove House, Tottenham.

## BOOKS RECEIVED.

"Scientific Opinion." Part XVIII. May, 1870. London: Wyman & Sons.

"Land and Water." Nos. 221, 222, 223, 224, 225, 226.

"Monthly Microscopical Journal." No. 17. May, 1870. London: R. Hardwicke.

"The Journal of Applied Science." April, 1870. London: Hailes & Co.

"The Animal World." No. 8. May, 1870.

"Catalogue of British Neuroptera." Compiled by R. McLachlan, F.L.S.; the Ephemeroidea by the Rev. A. E. Eaton, M.A. Published by the Entomological Society of London.

"Catalogue of Bedding, Alpine, and Decorative Plants, Seeds, &c., for 1870." London: Dick Radclyffe & Co.

"The Canadian Entomologist." April, 1870.

"The Gardeners' Magazine." May, 1870.

"The Carlow College Magazine." Vol. II. No. 1. May, 1870. London and Dublin: Moffat & Co.

"Literary Leaves for General Readers." May, 1870. Containing "The Devil Fish—a Novelist's View of Nature."

"Public Health, a Popular Introduction to Sanitary Science." By William A. Guy, M.B., F.R.S., &c. London: Henry Renshaw.

"Irregularities and Diseases of the Teeth:" a Series of Papers from the *Lancet* and *British Journal of Dental Science*. By Henry Sewill, M.R.C.S., &c. London: Churchill & Sons.

"Over den Oorsprong en de Verdere Ontwikkeling van den Periphyllus Testudo." Door C. Ritsema. Amsterdam: Van der Post.

"Le Naturaliste Canadien." Vol. II. Nos. 2 and 3. April and May, 1870.

"The Dental Register." Vol. XXIV. No. 3. March, 1870.

"Potato Culture." By F. Wilkins, C.E. 2nd Edition.

"History of Modern Anæsthetics," a Second Letter to Dr. Jacob Bigelow. By Sir J. Y. Simpson, Bart.

"The Moss Flora of Sussex." By C. P. Smith. Brighton and Sussex Natural History Society.

"The American Naturalist." Vol. IV. No. 3. May, 1870.

"Zymotechnic News." Vol. I. No. 3. April, 1870. St. Louis, Mo.

"Notes and Queries on China and Japan." No. 1. New Series. 7, Pedder's Wharf, Hong Kong.

"The Interior of the Earth." By H. P. Malet, E.I.C.S. London: Hodder & Stoughton.

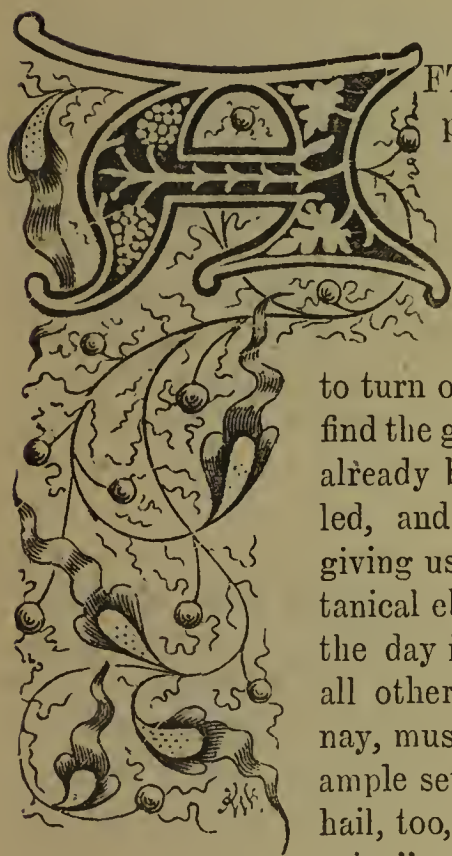
COMMUNICATIONS RECEIVED.—E. W.—C. E. M.—H. W.—H. D.—W. T. H.—H. P.—J. P.—M. S. W.—G. M.—W. H. G.—A. W.—H. C. L.—J. E.—A. H.—W. H. J.—J. R. S. C.—F. V. P.—J. G.—H. B.—W. B. C.—R. R.—C. L. C.—A. D.—E. W.—J. S. W. D.—R. T., M.A.—B.—J. W. B.—J. M. C.—T. S. W.—T. R.—J. S.—H. U.—R. J.—R. M.—J. W. N.—W. C.—H. D. W.—A. E. B.—J. G. O.—E. W.—A. A. M.—W. le W.—A. F.—J. F.—H. N. O.—E. S.—G. H. H.—S. A. B.—A. J. M. A.—E. K. S.—J. A., Jun.—J. B. R.—W. H.—D. P.—R. C.—C. A.—J. K.—H. B. K.—D. D. B.—E. de B. M.—B. T.—T. G. P.—W. D.—R. B.





## ACCIDENTAL VARIATIONS OF SEED-LEAVES.

By ROBERT HOLLAND.



AFTER reading Carlyle's pathetic lament,\* that there was no one found to teach him the first steps of Natural Science in his youth, it is pleasant to turn over just one page, and find the great writer's prophecy already beginning to be fulfilled, and a master of Rugby giving us an account of his botanical class. Let us hope that the day is not far distant when all other great schools will—nay, must—follow the good example set at Rugby. Let us hail, too, the “one dissentient voice” who discovered the three

cotyledons where there ought only to have been two, and hold out the hand to him as to a good friend and fellow-worker in science; not only because of the merit of his discovery itself, but because he has set much older workers than himself thinking about these things.

As soon as I had read Mr. Kitchener's remarks about tricotyledonous exogens, I began to cast it over in my mind whether I had not very frequently seen these variations. I felt quite sure that I *had* seen three seed-leaves, both in borage and in the seedlings of sycamore; and I fancied it was no uncommon occurrence in most kinds of plants. But I came to the conclusion that the best way to decide the matter was to go into my garden and inspect the various kinds of seeds that were then coming up, and see what information could be gleaned from them.

So I went there and then: and first, I looked through a bed of young lettuces, and very soon

found one with three cotyledons. Next, I hunted through two beds of radishes, but here I was unsuccessful; still, I found amongst the radishes some very curious examples, which have to be described presently. Then I attacked the borage; but neither here could I find any plants with three cotyledons; but I found a good many—perhaps half a dozen—that varied in quite as curious and interesting a way, for they had only *one* seed-leaf. In most instances this variation was caused by the entire suppression of one of the cotyledons; and then the one that was developed became very much broader than usual, being nearly orbicular, instead of oval, so as to compensate, in some degree, as it were, by increased size, for the loss of leaf-surface sustained in the decreased number of cotyledons. In one instance, however, the midrib of the cotyledon was distinctly forked, showing it to have been formed by the union of two imperfect leaves. The next seed-bed was parsley, and here also I found a tricotyledonous plant; then *Escholtzia*, with equal success. Then I set my boys to work, and they very soon brought me some sycamores, and they have since brought me a good many very curious instances of malformed seed-leaves; in fact, I believe it would be almost impossible to search through a garden in springtime without finding a great many of these curious and interesting variations.

Then, as to their cause, Mr. Kitchener says, “I did not see any trace of a double plumule, or any other suggestion of a double embryo.” Neither did I; except, possibly, in one case, where the stem of a three-leaved sycamore was considerably flattened at the upper part; but I do not think this arose at all from the junction of two embryos, because there was no trace of a furrow along the stem, or of duplication in the plumule. Still there are plenty of instances of twin embryos in seeds. They are the rule, and not the exception, in mistletoe. We frequently find two kernels in a nut; and

\* SCIENCE-GOSSIP, May, 1870, p. 112.



I dare say Mr. Kitchener knows the little bit of superstitious folk-lore that is attached thereto—namely, that *two* people must eat the two kernels, and wish; and their wishes will be fulfilled. I have growing at the present time two young oak-trees that came out of one acorn; and the same thing often happens, both with the oak and the horse-chestnut. I described some time ago, in SCIENCE-GOSSIP, a plant of Snapdragon of two colours, that was, I have not the least doubt, produced from a double embryo. If the embryos are separate in the testa, two distinct plants will be produced—"vegetable twins," in fact; but if the embryos are imperfect and united together, then a monstrous form, of the nature of "Siamese Twins," will be the result. In this, as in so many other respects, vegetables resemble animals in their economy. Double-yolked eggs will produce two perfect chickens, if the yolks are completely separate, and both fertilized; but if the yolks are joined together, as is often the case, chickens with four legs or two bodies, or otherwise unpleasantly united, are developed. This I have proved by experiment.

It would be quite *possible*, therefore, for seeds with three and four seed-leaves to have become thus developed through a union of embryos, as seems to have been the case with the examples of *Solanum* and *Haricot* quoted by Balfour; but I am convinced that in all the examples I have lately found, the extra leaf has arisen, not from this cause, but from the splitting of one cotyledon into two; for, in addition to the three-leaved examples I have enumerated, I have found a good many others, of several species of plants, that exhibit this splitting up in various stages; some where the division has only taken place near the apex of the leaf; others, where it has extended so nearly to the base that the cotyledon, at first sight, has all the appearance of two perfect leaves, and only upon close inspection is it found to be a single leaf, deeply cloven. The series is completed by examples in which the cotyledons are quite distinct and equidistant, forming a whorl around the plumule.

From these observations, and from the similar ones recorded by Mr. Paxton in the June number, I am led to believe that in nine cases out of ten triple cotyledons will be found to arise from chorisis. The fact of the resulting leaves being perfect in shape, and of the ordinary size, is no argument against this; for in the examples that I have met with, the new leaves formed were of the usual size and shape, *even when the separation was not quite complete*.

Still, it seems to me quite possible that in some cases three-leaved embryos may have grown from trifoliar phytons, as suggested by Mr. Kitchener; and that these variations may have been induced by cultivation, which we know plays strange pranks with vegetable organisms. Certainly, the tricotyl

ledonous seeds that I have found have, with one exception, been those of cultivated plants; and even that exception, the *Ranunculus*, was growing in a pot in a hotbed. Sycamores, however, which have yielded the greatest number of curious forms both to Mr. Paxton and myself, could scarcely be said to be in a cultivated condition. I have not sought in the fields or hedge-banks for examples, because the garden was the most handy place; but I think variations would most likely be found amongst the seedlings of wild plants, if we were to look for them.

Whilst examining the radishes, I found some very curious examples of leaves, intermediate between cotyledons and "rough leaves." There are many plants which the cotyledons resemble, in a slight degree, the second leaves—as, for instance, *Escholtzia* and *Feverfew*, and in these there is a regular gradation from the slightly-cut cotyledons to the deeply-cut and jagged upper leaves. But in the radish there is so wide a difference of form and texture between the obovate, smooth seed-leaves, and the lyrate and very rough rough-leaves, that an intermediate leaf, partaking of both their characters, becomes more remarkable. I have often seen them, and have found examples where one half of the intermediate leaf resembled a cotyledon, and the other half an ordinary leaf; again, where it resembled an elongated cotyledon, with a tendency to roughness. These are not third cotyledons developed as in other cases. There is always this difference between cotyledons and other leaves, that, whether a plant bears opposite or alternate leaves on its stem, the *cotyledons* are always opposite, forming a sort of socket from which the plumule springs; but in the other tricotyledonous plants, and doubtless also in those found by Mr. Kitchener, the third cotyledon was in the same plane as the other two. But these leaves of the radish are perfectly different, for they are not placed in the same plane as the true cotyledons, but are part of the plumule; they are, both in form and in position, intermediate; and I think they show us that cotyledons are not organs *per se*, but are simply the two lowest leaves of the stem, altered for a special purpose.

#### MUSICAL FISH.

THE communication from my old friend, the Rev. W. W. Spieer, under the head of "Musical Fish," which I have just read in the March number of SCIENCE-GOSSIP, has put me in mind of an intention long entertained, but never as yet fulfilled, of sending you an account of a phenomenon similar to the one described by him, which I witnessed some years ago.

In the month of February, 1857, having waited at Tavoy a long time in vain for the arrival of the



Moulmein steamer to take me on to Mergui, I determined to make the voyage in a native boat.

The distance from Tavoy to Mergui is about one hundred miles, viz., forty down the Tavoy river to its so-called mouth—really a broad estuary—and thence sixty miles by sea. The greater portion, however, of these sixty miles is shut in from the Bay of Bengal by the northernmost islands of the Mergui Archipelago, and the sea is comparatively shallow, with a muddy bottom all the way. It is but a short night's run for a steamer, but I was three days and nights performing the distance.

When about forty miles (as I suppose) from Mergui, where the breadth of the sea between the main and the islands is about ten or twelve miles, on the night of the 10th of February, I was overtaken by a violent storm of thunder and lightning, accompanied by a strong wind and torrents of rain, which lasted nearly all night.

The wind blew from the south, *i. e.*, from Mergui; but, had it been favourable, we could not have ventured to hoist a sail on a pitch dark night in a round-bottomed canoe during such a storm. So we "*dropped the stone*," as the Burmese say, or let go the wooden anchor weighted with a stone. Crouched all together (*i. e.*, two Burmese boatmen, my native servant, and myself) under the covered part of the boat for shelter from the driving rain, and "wished for day."

The storm was followed the next day and the succeeding night by an absolute calm. Not a breath in the sweltering air, not a ripple on the oily sea! The boat lay motionless, drifting with the sluggish tide, when that was favourable, anchored when it was contrary, for it was too heavy a boat for two men to row. Nothing moved but the sun, and he all too slowly. Not a sound reached the ear, and the haze shut out the sight of the land on either side.

When night fell again, and the stars shone out bright and clear, the same calm continued, and we lay still and motionless as ever. But with the growing darkness there came a sound upon the ear,—a strange and peculiar sound, though from what quarter it came it was difficult to determine, for it was not borne on the air from a distance; had it been so, I might have fixed upon the direction whence it came, but it was above, below, and around. The air was all sound, and the sound was all of one kind and pitch,—a droning, drowsy sort of sound, and unintermitting.

It is difficult to convey in words a correct idea of the sound; no articulate sound would resemble it. M. de Thoron, as quoted by Mr. Spieer, compared what he heard to the music of an organ listened to outside a church, where, I suppose, all distinction between one note and another would be lost, and a confused vibration would be the result. What I heard might, somewhat fancifully, be so described. He says, the noise was "grave and prolonged," so

was this. The nearest approach to a true description of the sound (as, at least, it seemed to me) which I can give is to imagine a huge drum beaten, at short and regular intervals, a long way off, and the sound coming across the water in sustained waves of varying intensity. The sound, however, can be pretty closely imitated by closing the lips, keeping the teeth apart, and then trying to utter the letter M in the deepest possible tone, and with prolonged breath; the result will be an inarticulate *Hum*.

I could not imagine whence such an unusual sound proceeded, nor could I learn from the boatmen what it was. At that time I was not aware that fish had "voices," or that they could utter sounds of any kind; I was slow, therefore, to attribute the sound to them, although I felt sure, after a while, that it arose out of the sea all around me.

Now, however, I am satisfied (and have been for some time), that that mysterious sound proceeded from the fish in the sea, though from fish of what kind I do not know; and that M. de Thoron and myself have witnessed the same phenomenon in two very different parts of the world there can, I think, be very little doubt.

Since the occurrence above related I have not only read that the utterance of sounds by fish is a known fact, but I have had proof of it. There is a little fish in the sea at Amherst, at the mouth of the river Salween, which, on being irritated with a stick, inflates itself to a ridiculous size, and at the same time gives a sort of croak. It has a mouth like that of a turtle, and is, I think (though I know nothing about fish), a species of *Tetrodon*. There is a species (whether the same or not I cannot say) high up some of our rivers which is a "caution" to bathers, as it can, and does, give a wonderful nip with its little mandibles. The Burmese call it *gna-boo-den*.

Moulmein, April 20, 1870.

C. PARISH.

I HAVE heard these fish on two very different occasions—once off the west coast of Ceylon, in deep sea water; and once in the Sarumoth river (Borneo), in six fathoms fresh water—in the former case in an iron-built vessel, in the latter wooden: so that it appears these fish are not confined to such special localities as some of the published accounts imply; neither do they limit their visits to iron vessels, as a writer in the May number of *Nature* appears to think.

Off Ceylon we were about one hundred miles north of Colombo—eight leagues from the shore, and in a depth of water exceeding one hundred fathoms—time, shortly after sunset. When the sounds were first heard they might have been taken for faint echoes of music from the distant shore, until, after listening attentively, they were found to



come up from below the surface of the sea, and fell upon the ear something like the tones of an *Æolian* harp, rising and falling in regular cadence, and impressing the mind with a sense of something distinct from what had ever been experienced before.

On the following morning a number of small fish were seen swimming about the rudder, and upon catching two or three, they were found to have an *attaching* apparatus at the back of the head, similar to those I had seen in a fish in the West Indies, called by sailors "sucking fish"; and it is this which I take to be the musical instrument. This supposition is strengthened by the fact that if the ear be laid upon an adjoining part of the vessel while the sounds are heard, the source of them appears to be in *contact* with the vessel, and no longer at a distance, as when the ear is detached. My idea is that these little creatures carry their little harps upon their heads, and that they can only play them when fixed upon a smooth surface, such as the bottom or sides of a ship, and that they have no power of emitting any sound when swimming about like other fish. I would ask,—May we not have here, in these finny singers, as they may be called, the origin of the myths about the songs of sirens, mermaids, and similar fabulous stories? for in the ages when every natural phenomenon was personified and invested with a poetical halo, this music of the sea would be the songs of sirens, dwelling in caves and grottoes far down in the depths.

I would remark, in conclusion, that from what has been written about the size and sounds of the "drummer" fish, off the coast of America, it is apparently of an entirely different kind from that in the eastern seas.

The same night on which the musical fish were heard was distinguished by a still more remarkable and very interesting phenomenon—a pulsation of electric light, alternating with darkness, for a period of nearly two hours, with a luminous sea, which continued until midnight, by which time it had gradually disappeared. Though the source of the light which illuminates the sea is electric, I hold it to be true, in opposition to the view generally held, which is that we have an animal source; and I think it will be discovered that the only purpose served by all animal life in the sea, when it is luminous, is like that of the material of a torch, and that the flame is electric light. I shall be glad to see some of your scientific contributors giving their attention to the subject.

Shere, Surrey.

W. C. P.

#### CATERPILLAR NURTURE.

THE Lepidopterist, if he takes a hearty interest in his favoured study, must devote a certain portion of the time he allots to it to the rearing of caterpillars. An "interesting and instructive" pursuit—yes, undoubtedly it is, yet one which has attached to it many disappointments and failures. Admirable is it, we may grant, as an exercise for patience; a good quality rarely superabundant in humanity, yet we should hardly recommend it as a specific to an irritable and impetuous man, since some small measure of patience is necessary to induce any one to enter upon the preliminary stages, by means of which he may advance by slow degrees, until he becomes expert as a caterpillar breeder. Small beginnings are the way to progress, and from feeding up such common fry as Vapourers and Ermines, he may proceed to the successful nursing of the rarer and more delicate and troublesome species; for, odd as it seems, choice larvæ are usually the most difficult to bring up, and the insect-hunter sometimes, when he comes across one or two larvæ of known rarity, is compelled to look at them regretfully, not knowing whether they are not already the prey of some parasitic enemy, which is fattening within them; or expecting that through some unexplainable cause, they will pine away just as they are approaching what should be their maturity: a not uncommon circumstance.

Of course, to commence your work of breeding by obtaining the eggs of butterflies and moths, wherever you can get them, and then watching for the emergence of their infant progeny is the best plan; though it will not do to enumerate too positively your entomological chicks before they are hatched, as eggs are sometimes unfertile, or the shells will so harden that the young larvæ cannot emerge. Nor, indeed, after they *are* hatched, can you make at all sure of the number which you will rear out of what may seem a very promising hatch. In many species, the first thing done by the newly-hatched larva is to nibble up its egg-shell, a strange feat of mastication, and not at all what we should consider proper for the delicate organs of the mouth and stomach, ere they have made any trial of vegetable food—much as inconsistent apparently as it would be for a baby of the human race to attempt to "chaw up" its rattle or its coral. However, that done, the young larva is ready for something of a softer nature. And now begins the trouble of the feeder. "You may bring a horse to the water, but you can't make him drink." So you may carefully place a caterpillar on its proper food-plant, just in the right stage of growth, yet it may determinately refuse to eat. It would be a natural inference, one might say, that a very young caterpillar should prefer tender and newly-developed leaves (if these

QUEKETT MICROSCOPICAL CLUB.—Dr. Lionel Beale, F.R.S., F.R.M.S., &c., is the President elect of this Club for the ensuing year.



be his food), and in many cases this is so, yet there are puzzling exceptions. The mother insect, too, is careful to deposit her eggs in such a place (usually) that the caterpillars, immediately they require it, can obtain their appropriate food; and we find, in confinement, that it is necessary to actually place the very young larvæ on the leaves or flowers they should feed upon. Thus, sometimes a brood of young caterpillars will emerge in a box, and the entomologist might place twigs very near them, but the probabilities are that they will not find their way to these, either by smell, or by sight; and may actually starve close to plenty. So, also, as larvæ increase in size, we often find that when fresh food is introduced, and placed beside those on which they are feeding, they will obstinately persist in clinging to that which is stale, and have at last to be removed from it. Therefore, in the case of a number of species, it is better to remove them from the twigs or leaves which have become unfit for their food, and place them upon those which we substitute.

Another singular circumstance in the case of some newly-hatched larvæ is this; that for hours, or perhaps for days, they show a strong inclination to wander about. The Loopers, or Geometers, are especially given to this, and will go "looping," or "straddling" about at an unpleasant rate, neglecting their food, and seemingly inflicting annoyance on each other, when they happen to come into contact; for such a piece of politeness as standing out of the way to let another individual pass is unknown in the realms of insect life. However, if one does not move, the other is at no loss what to do, but coolly steps upon the obstructing individual, and in certain species the result is that they attempt to bite, or actually do bite each other. The young Bombyces, of several species, are also sadly sure to wander about in a very purposeless manner; so that we are placed in circumstances of difficulty with these, it being needful that caterpillars should have a certain freedom of locomotion, or else they will not thrive, and yet it does not do to allow them to stray off their food-plants at their pleasure. This may be taken sometimes, though, as an indication that the leaves, or other food with which they are fed, does not suit their taste, and then some change should be tried. A little trouble is occasionally given by another circumstance, that, in the instance of some plants and trees, when the leaves are gathered with a slight film of moisture upon them, it appears to prevent, at least in breeding-cages, the larvæ from obtaining a firm hold of the leaves with their claspers, and yet it is so very little in amount that it can hardly be removed. In transferring larvæ from one twig to another, I have sometimes had an individual roll off several times before he could be safely located on his fresh provender. A precaution must also be taken with

some species which are very fond of dropping by a silken thread. Most species will, indeed, do this, under stress of circumstances; but there are some kinds particularly apt thus to throw themselves off their food, at a slight alarm; nor can they always recover themselves with readiness. Thus, in removing larvæ of the scarce Vapourer (*O. gonostigma*), while young, by the aid of a camel's-hair pencil, I have found that it will not do to attach them by these threads to a leaf, and leave them to regain their equilibrium. This they frequently fail to do, and may be found some hours afterwards sometimes still swinging round and round, as if they were being roasted,—the issue being death, or a serious check to the growth of the caterpillar. Neither should caterpillars be shifted from one place to another, nor in any way disturbed, while in the act of undergoing their changes of skin, at which time they deem quiescence desirable. Exceptions occur amongst the Geometers; a few caterpillars of this family perambulate about during the interval they are awaiting the change, though not eating. But we are not surprised at an erratic tendency showing itself amongst our friends the "Loopers," whose slim bodies are so particularly adapted for locomotion. It is desirable, at least in the case of caterpillars which are of rarity, that at the changes of skin they should be protected from the annoyance they would be likely to get from others, even of their own species, by separating them for the time.

In feeding caterpillars their peculiarities should be studied. There are some that, after eating, seem to prefer to hang head downwards—an odd mode of facilitating digestion. Others like to have a bare twig at hand, on which they can extend themselves at full length. There are others again, which retreat at times to dry or withered leaves, resting on or under these when not feeding. Some will form an apparent attachment for one particular leaf, as was the case with the larvæ of a *Noetua* I had in feeding. A dry birch leaf in one corner of the cage was the regular resort of half a dozen of these, and they stretched themselves side by side under it for hours during the day, and exhibited as much discomfort when it was removed—so that they retreated to their corner in vain—as an old gentleman of the Georgian era would have felt if on retiring for his nightly repose, the tassled cap which was to cover his "phrenological development," had been carried off!

Caterpillar quarrels, as already hinted, will be of occasional occurrence in most species when confined. Some there are, like *Trapezina* and *Satellitina*, which are well known, not merely as unfriendly to others, even of their own species, but by nature actually cannibals, and preferring live caterpillars to vegetable food. These may be fed on common species if thought desirable; of course they must be kept from all contact with others it is wished to



preserve, except those well coated with hair, which they would hardly venture to attack. The caterpillars which agree best together are, of course, those which are termed "Gregarious," or "Sociable." At times individuals belonging to some species which inflict singular injuries upon each other. The well-known "Puss" larva will nibble off the anal horns of a brother at a moment when he is reposing; and the larvæ of the *Sphangine* will also attack the horn which ornaments the extremity of the body in various species, when they have a chance. There are, in fact, endless diversities observable in the habits of larvæ, and the study of them affords much amusement, and something more.

J. R. S. CLIFFORD.

### SEA-URCHINS.

AS summer draws on, and those who are able to afford the luxury, begin to dream of withdrawing for a while to the sea, inquiries for a sea-side book, useful and entertaining, will make themselves heard. In prospect of such an event, we commend (the one with its title at the foot,\* and from which we proceed to quote what the author has to say about sea-urchins.



Fig. 132. *Astrophyton verrucosum*.

The Asterias resemble stars; the *Echini*, or sea-urchins, may be likened to melons, yet both belong to the same class, the Echinoderms.

\* "The World of the Sea," translated and enlarged by the Rev. H. M. Hart, M.A., from "Le Monde de la Mer," by Mons. Moquin Tandon. London: Cassell, Petter, & Galpin. The illustrations to this notice kindly lent by the publishers.

The sea-urchins are enclosed in a calcareous kind of shell, which is generally globular, or egg-shaped,



Fig. 133. *Pentacrinus Europæus*.

but sometimes flattened. This shell, or carapace, is really built up of polygonal plates, which adhere by their edges to each other. The plates are so arranged that the shell is divided into vertical zones; hence its resemblance to the melon. These zones are of two kinds, one being very much larger than the other; the plates of the larger zones are covered with sharp spines, which are movable, and serve at once for protection and locomotion. The plates of the smaller zones are pierced with pores, from which issue filaments, by which the animal breathes and walks.

In the edible sea-urchin (*Sphærechinus esculentus*) the shell is composed of 10,000 distinct pieces, so admirably and firmly united that the whole appears but one piece. The prickly spines are often very numerous; they cover and protect the shell. From these bristles the animal has been named the "Sea Hedgehog." Its scientific name is derived from *ἐχῖνος*, which was given to the creature by Aristotle, from the evident resemblance

the shell of the echinus, denuded of its spines, bears to a "vase."

In one species, as many as 2,000 bristles have been counted; in the edible sea-urchin there must be at least 3,000. These appendages entirely cover and hide the calcareous tunic which envelopes the animal, like the numberless pearls which covered



the famous habit of St. Simon—the material was of silk, but it could not be seen. The bristles of the sea-urchin present, at their base, a small hollow head, which has a compression on its lower surface, thus forming a cavity which fits a tubercle on the

penetrated with countless holes, and are affixed to each other by prominences, so that, looking at the spine, we only see the edges of the plates which compose it. A membrane covers the whole, which is furnished with vibratile cilia.

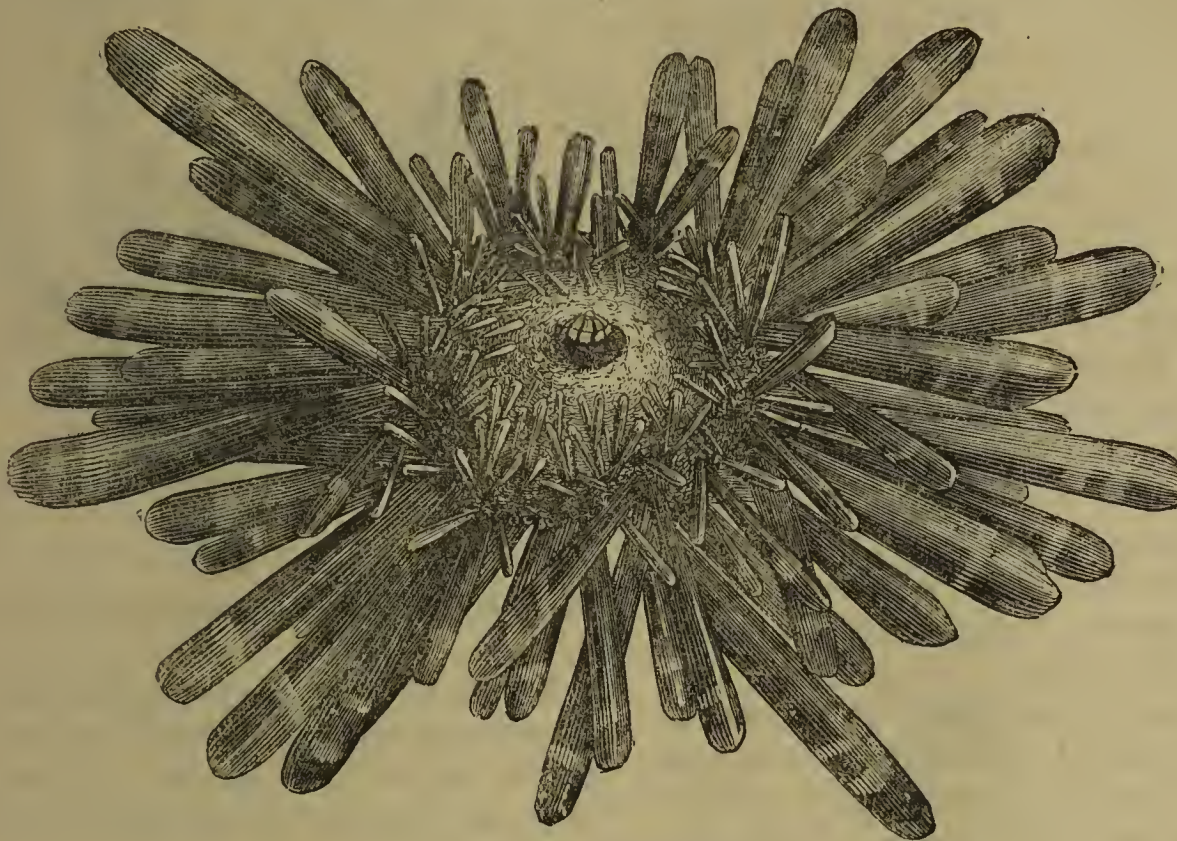


Fig. 134. *Echinus mamillatus*.

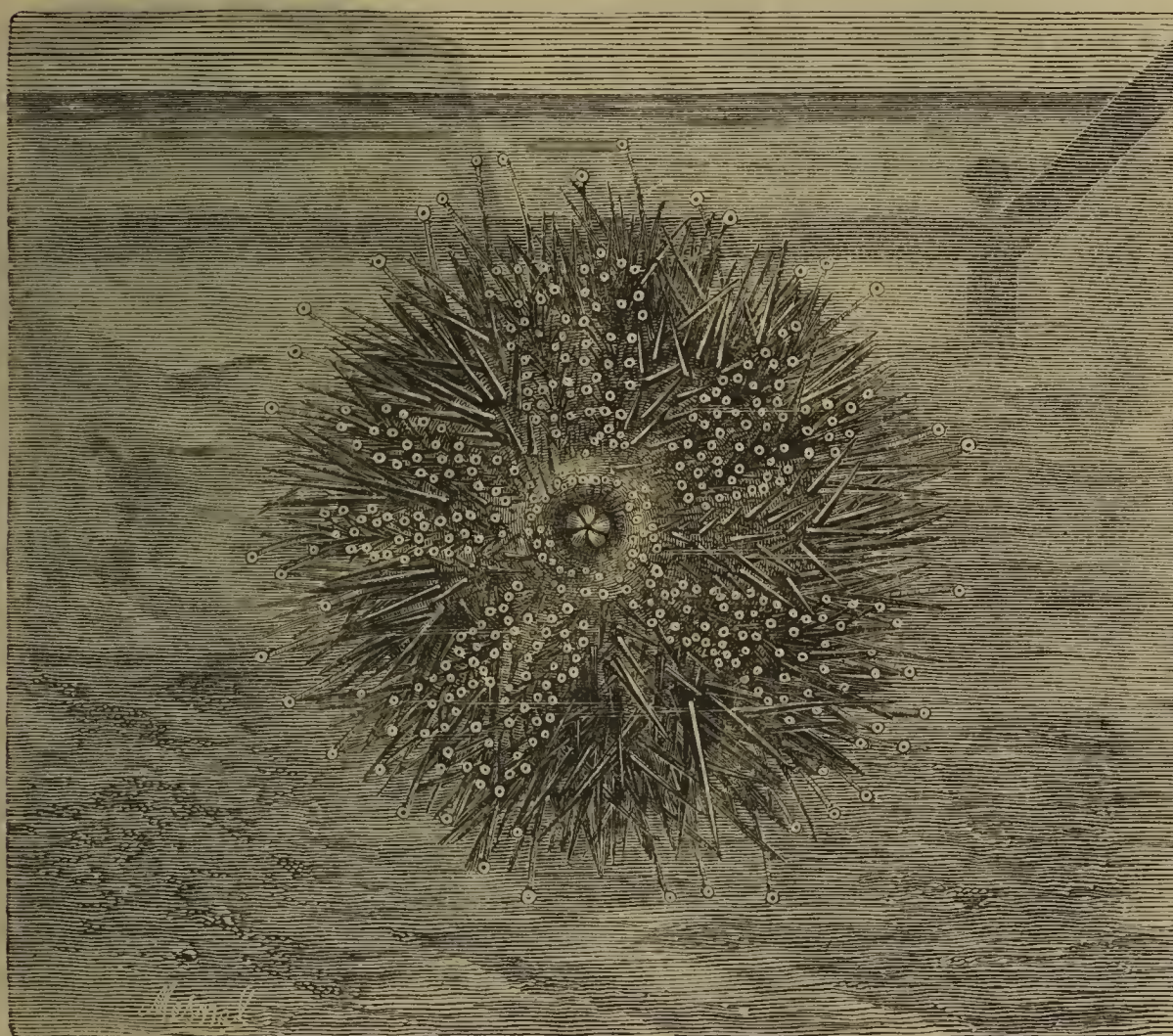


Fig. 135. An *Echinus* climbing up the side of an aquarium.

carapace. Each of the prickles, notwithstanding its extreme minuteness, is put in action by a separate muscular apparatus. They are porous, and are often grooved longitudinally, being formed of thin plates, which radiate from their centres. These are

The shape and dimensions of these spines are very variable. In certain of the echinoderms they are three or four times longer than the diameter of the shell; while, in others, they are only three-fourths or four-fifths of that diameter; while in



others, again, they are reduced to mere protuberances from the carapace. These appendages are ordinarily awl-shaped and pointed; occasionally they are cylindrical and obtuse; and in some species they are flattened, and even have their edges truncated.

In one species, which inhabits New Holland, M. Hupé found a mollusc *Gasteropod*, belonging to the genus *Stylifera*, enclosed in one of the spines, which was hollowed, and greatly changed, both in form and structure, by the presence of this little parasite.

Among all the sights which Nature presents to us, there is scarcely one more interesting than that of creatures giving to each other shelter, and food, and protection, whether voluntarily or involuntarily. Is not the instinct of the *Stylifer* marvellous? Nature has bestowed upon one creature an armour of bristling bayonets, when another animal, much smaller, seems to approve of the admirable defence, and takes up its abode in the midst—nay, actually in the spines, which henceforth protect itself as well as the urchin.

When the bristles fall off, the echini are found on our shores, very much like round fruit, ornamented on the sides with tubercles, symmetrically arranged. Their round form, and, perhaps, especially the limy nature of their shells, has obtained for them the name of *Sea-eggs*. The flattened species, denuded of their spines, are more like cakes than eggs.

The tentaculæ of the sea-urchins are hollow, very elastic, and are terminated by a sucker. The animals can inflate them by injecting into them liquid through their prickles, and by this means they can fix themselves to any foreign body. These organs are very numerous; in the ordinary urchin there are at least 1,400, and in the Melon Echinus about 4,300. They can move by means of their tentaculæ and their spines. Professor Edward Forbes once saw one crawl up the sides of a very slippery vase.

To understand better how they use their organs of locomotion, imagine one at rest. All the spines are motionless, all the filaments are contracted within the shell; when the creature wishes to move, some of these involuntarily begin to come out; they extend themselves, and feel the ground all round them; then others follow. The animal fixes some of its tentacles to the vase in the direction in which it wishes to advance, these then contract, while the hinder ones loosen their hold, and thus the shell is drawn forward. The sea-urchin can thus advance with ease and even rapidity. During the progression, the suckers are only slightly aided by the spines; indeed, the latter only serve as points, upon which the creature rolls as if it were on stilts. It can travel as well on its back as on its stomach. Whatever may be its posture it has always a certain number of spines which are ready to carry it, and suckers which can fix it. In certain circumstances, the animal walks by turning itself round on its spines, like a wheel in motion.

The mouth of the Echinus is situated underneath and is generally in the centre. Around this orifice are fleshy tentacles, projecting from the surface, and more or less retractile. These are the organs which seize the food.

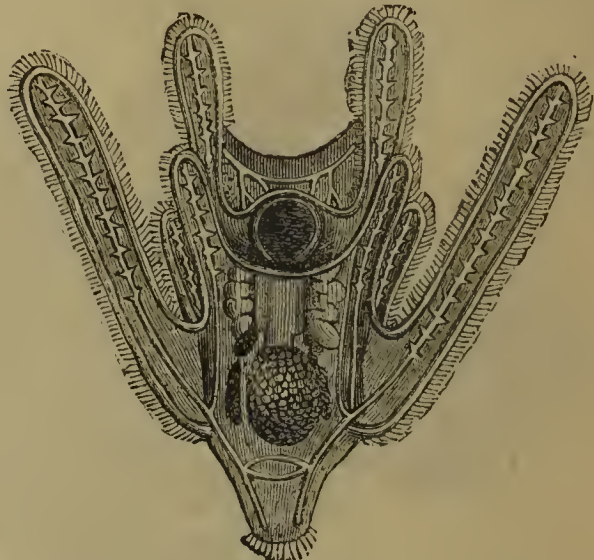


Fig. 136. Magnified larva of Echinoderm *Pluteus paradoxus*.

The digestive system presents a very complicated osseous apparatus, for a long time known as "Aristotle's lantern." It consists of five pieces—the *teeth*, the *plumula*, the *pyramids*, the *compass*, and the *scythe*.

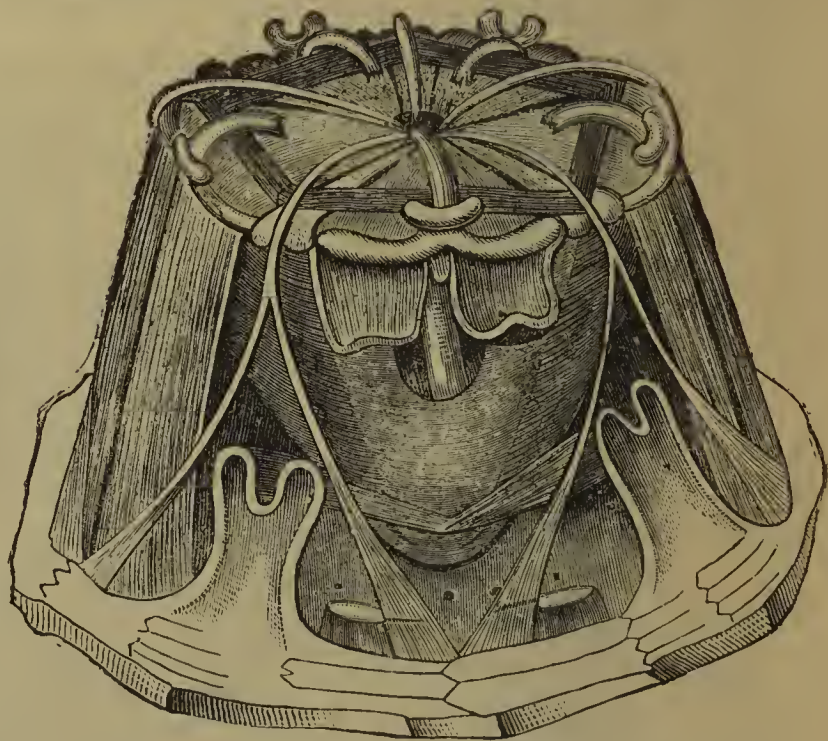


Fig. 137. The Buccal apparatus of an Echinus, magnified. "Aristotle's lantern."

The teeth are five in number. They are fixed on the same base, which is the *plumula*, and these are situated upon the edge formed by the assemblage of the pyramids, which are ten in number, and are joined in pairs. The lower part is made firm by the five scythes, and the five compasses. In fine, the dental apparatus consists of no less than thirty pieces. The teeth are long, sharp, curved, and very hard. They can cut the hardest substances. However, in spite of their adamant character, they would soon be worn down by work, but Nature has wisely provided for their renewal. They grow from the base as they are worn down at the points, like the incisors of beavers, hares, or rats: so that they



are always sharp, and always in good working order.

The urchins live upon sea-weeds, worms, molluscs, and even fishes. Professor Rymer Jones saw one of these creatures seize a live crab, which appeared perfectly paralyzed, and attempted no resistance. At another time an urchin caught a *Galatea* by its buccal appendages, but the *Galatea*, happily for itself, opened its pincers, cut off the part held by the urchin, and so escaped.

Many of these urchins, though defended by a calcareous shell, and by sharp-pointed spines, do not consider themselves sufficiently secure; for they hollow out holes in the hardest rocks, in which they ensconce themselves. To effect this really difficult task, they fix themselves by their tentacles to the surface of the rock; they then make an incision by means of their powerful teeth, and remove the *débris* as it is formed by their spines. MM. Caillaud, Robert, and Lory have published some most interesting information upon this boring power of the *Echinus*. It seems that even the young urchins, almost as soon as they are developed, commence the work, and form for themselves a hole fitted to their size. Poor little quarrymen, who pass a great part of their lives in working 'granite with their teeth!

When an urchin is cast up upon the shore and left by the water, it buries itself in the sand, which it excavates with its spiny appendages. The place where it is hid is easily recognized by the hole which it has left in its entombment. The fishermen pretend to foretell storms according to the depth to which the sea-hedgehogs bury themselves.

Linnaeus has enumerated only seventeen species of *Echini*; Gruelin one hundred and seven;—but how many hundreds are known!—and this group of animals has become the type of an entire class—the *Echinodermata*.

In many countries the sea-urchins are eaten raw; their flesh is yellow, and of a very agreeable taste. Those which are esteemed in Provence are the *edible*, the *granulous* (*Toxopneustes granularis*), and the *livid* (*Toxopneustes lividus*). A member of this last species is also in request at Naples, where the "Melon urchin" (*Echinus melo*) is served at table as a regular dish.

#### THE ATTRACTIVE POWER OF FEMALE MOTHS.

AT a recent meeting of the Brighton and Sussex Natural History Society a paper was read by Mr. Wonfor on this subject.

After minutely describing the "Emperor" moth (*Saturnia carpini*), in the perfect, the larval, and the pupal state, Mr. Wonfor proceeds to say:—

It belongs to a group, the females of many of

which are noted for the peculiar property they possess of collecting, or, as the old entomologists named it, "sembling" the males from long distances. Some consider the females emit an odour perceptible to the sense of smell in the opposite sex, though the existence of such an organ has not yet been satisfactorily localized by naturalists. Be that as it may, they certainly have the power of drawing from long distances and in great numbers, the males of the same species, who, as it were, intoxicated, rush wildly after the females, heedless of danger, and allow themselves to be captured with the greatest ease. Nay, what is more strange, few persons walking over districts where these creatures abound ever see them, unless they are provided with a virgin female, and then under favourable circumstances, and always against the wind, the males come flying up singly, or in twos and threes. Last autumn we gave an account of our success with the Oak Egg-moth.

I will now (proceeds Mr. Wonfor) detail what happened with females of the Emperor. Friday, April 22nd, I obtained two females of *S. carpini*, which had emerged that morning; but, as a male had come out in the same box, I was uncertain whether both or only one was a virgin, and therefore I determined to take both on the following day to Tilgate Forest. I arranged with a friend who had a virgin female to start by the 8.55 train; but circumstances prevented our going. On the Monday, April 25th, having occasion to go to Eastbourne, I took the two females with me, and, on the return journey, got out at Polegate and walked in the direction of Hailsham. About three, while crossing a stile at the end of a wooded lane, a male fluttered round me for a few seconds and then made off. A few minutes later, and about a quarter of a mile distant, another came up and was secured. A few minutes later, while talking to a woodcutter in a lately cleared coppice, another came up and was taken. While explaining to the woodman the cause of attraction, two males came up, and at intervals seven others. Of these latter I caught six, making in all nine out of the 11 I saw. I found on inquiry that there was no heather within a mile, but that willows and poplars were in the neighbourhood. One male not simply flew at, but got into a leather bag containing the females, which were in a muslin-covered box. The woodcutter was very much astonished, and expressed it in such words as these: "I have been man and boy about the woods and fields all my life, and never heard tell of such a thing afore; if any one had told me I wouldn't have believed it, but now I have seen it I will. Can't ye tell me of summut as 'ull draw the fish same way?" Nothing came up after four o'clock, though I walked about the lanes till nearly seven o'clock.

The same day that I was so successful, my friend went to Balcombe with a female, and walked Til-



gate Forest through and through, from ten till four o'clock, without seeing a single male. This, as will be seen, was very remarkable.

Tuesday, 26th. Left Brighton by the 11.30 train for Balcombe, taking the two females with me, not knowing at the time of my friend's want of success. We got into the forest about one, and walked about for nearly two hours without seeing a single specimen of *S. carpini*. My youngster, boy-like, began to get impatient, when, a little before three, one male came up against the wind, which was blowing strongly from the S.W. After this, for about an hour and a quarter, we were busily engaged in taking the males, which came up singly, or in twos and threes. We captured 34 specimens, nearly the whole of which were in good condition. Some few, in trying to reach the box containing the females, damaged or slit their wings among the heather, and five, which settled about the box, we failed to take, simply from the inability of securing more than two or three at a time. At one time we covered two with our nets, while we bottled a third. Not counting those which flew around and beyond without settling, we counted 39. These, with the 11 of the day before, made up the astonishing number of 50 in the two days. I know that even larger numbers of some species have been drawn up; but we had been told, on the authority of several entomologists, that 14 was a very good day's work; moreover, that the attractive power of the female passed off after the second day. This we did not credit, as we had proved the contrary with the Oak Eggar.

Now, the question naturally arises, by what sense are these creatures attracted? It cannot be by sight, for the females were in a box on the side of a slope and the males flew across the valley and close to the surface of the ground. When trying similar experiments with other species, we purposely selected a field with a wood at the end, and saw the males flying over the tops of the trees. If it be by smell, then the odour, to us quite imperceptible, is wafted to enormous distances.

Another very natural question arises: Does the same state of things prevail with other insects? To this I answer, to a certain ascertained extent it does, and, doubtless, the list of known examples might be extended, if experiments were tried. In the case of the Apterous and Semi-apterous moths, such as *Orgyia*, *Cognostegma*, and many others, the females hardly move from the place where they emerge,—nay, some of the Vapourers even lay their eggs on the empty cocoon, and there is little to wonder at in the males seeking their society; but with those species which possess the power of very rapid flight, the fact of the females remaining stationary and quiet is very remarkable.

This peculiarity has long been known to British entomologists. Barbut and Moses Harris practised this method, which they termed "sembling," and

Haworth says, "It is a frequent practice with the London amateurs, when they breed a female of the Lappet moth (*G. quercifolia*), and some other day-flying species, to take her in a box with a gauze lid into the vicinity of the woods, where, if the weather be favourable, she never fails to attract a numerous train of males, whose only business appears to be an incessant, rapid, and undulating flight in search of the females. One of these is no sooner discovered than they become so much enamoured of their fair kinswoman as absolutely to lose all fear for their own personal safety, which at other times is secured by the reiterated evolutions of their strong and rapid wings. So fearless, indeed, have I beheld them on these occasions as to climb up and down the cage which contained the dear object of their eager pursuit."

In the *Zoological Journal* (vol. v. p. 142) there is a very curious record of observations made by J. H. Davis, Curator of the Portsmouth Philosophical Society, who being, as he says, engaged in adding the British insects to the collection of the Portsmouth Philosophical Society, "had procured a variety of larvæ. \* \* \* They in due time had passed into the pupa; and the first which emerged was a female *Sphinx convolvuli*. On going into my study in the evening I found it fluttering on the floor. On lifting it up it ran up my coat, and several times round the collar before I could place it in safety. I went from thence into my garden, to shut some hot-bed lights, where I was occupied about ten minutes; from thence again to my study, where I found two fine males of *Sphinx convolvuli* had, whilst in the garden, attached themselves to the collar of my coat, where the female had previously been.

"After this, another female of the same species had been produced; three males found their way into my study down the chimney, there being no other mode by which they could obtain entrance, and one of them fell into a vase standing under it, where he was captured. A few days after, two females of the *Phalæna salicis* (satin moth) emerged. On the same evening I saw several of that species fluttering against the window; and on opening it six males rushed in and instantly sought the females. Precisely similar circumstances took place with the *Phalæna neustria*, the males presenting themselves at the window."

We could give other examples to prove the point that this power of "sembling" is not confined to one family of moths. We would urge those who have the time and opportunity to try experiments with females of each family, and see whether the same law does not prevail, more or less, with all. We have often seen several male butterflies round one stationary female, and last autumn, wishing to diminish the *Tipulæ* daddy-longlegs, I instructed my youngster to collect all the females he could as



they emerged from the grass. As he caught them he placed them in a paper box made out of an envelope, and became somewhat annoyed by finding the males not only flying at, but alighting on him in great numbers. This I consider another case of scrambling.

In an account of the *Saturnia mylitta*, the moth which produces the *Tusseh-silk*, given by Dr. Roxburgh in the *Linnæan Transactions*, vol. vii. p. 33, is a letter written by Mr. Atkinson to a Mr. Pope, of Mahometpore, from which we make an abstract on this wonderful subject:—

“The difference between the two species is that the natives retain a part of the Jaroo cocoons for seed; these they hang out on the Asseen trees when the proper season of the moth arrives. When the moths come out, the male insects fly away; but the females remain on the trees. These are not impregnated by the males bred along with them, but, in ten or twelve hours, or perhaps one, two, or three days a flight of males arrive, settle on the branches, and impregnate the females. By the bye, the hill-people calculate good or ill fortune in proportion to the speedy or tardy arrival of the stranger males. In regard to the Bughy species, they all take flight, females (as well as males, and hence the natives firmly believe that they are all males, though I cannot conceive any physical reason for supposing them so. I have frequently endeavoured to detain the males of the Jaroo species, and have kept them locked up in a box for that purpose; but whether they did not like to make free with their female relatives, or upon what other cause I know not, I never could obtain them in the domestic state, and the efforts of the male to escape were wonderful, and, at last, always effectual. The accounts given by the natives of the distance to which male insects fly are very astonishing. I have put, at different times and occasions, innumerable questions to them on this subject, and they assure me that it is no uncommon practice among them to catch some of the male moths and put a mark on their wings previous to letting them fly, the marks of different districts being known. I am told that it has been ascertained that male moths have come from a distance equal to a hundred miles and upwards. I, of course, cannot vouch for the truth of this, but have no hesitation in declaring that I believe it.”

A curious confirmation of an idea that the moths have times of flight was given on Saturday, May 7th. Mr. Goss had taken a female up to Balcombe in the morning, and had not attracted a male until between two and three o'clock, between which time and a quarter to four o'clock, five were attracted. Some of those with us on Saturday saw two taken. Now, curiously, the time agreed exactly with the times at which in every case the males began and ceased coming up with us.

## D'ORBIGNY'S FORAMINIFERA.

IN completion of the figures of Foraminifera of the Chalk figured by D'Orbigny, of which we have already presented two instalments, we now proceed with the enumeration of the residue of forms contained in the Memoir on that subject.

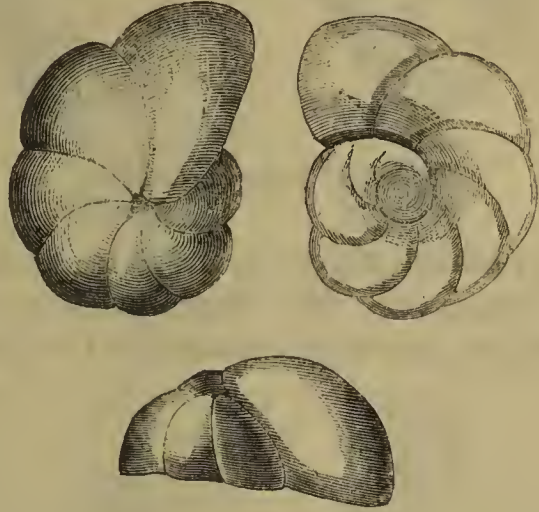


Fig. 138. *Truncatulina Beaumontiana*.

37. Succeeding *Globigerina*, figured in our May number, is one species of *Truncatulina* called *Truncatulina Beaumontiana*, said to be rare at Meudon and in England (fig. 138). The localities given by Professor Morris are Gravesend and Warminster.

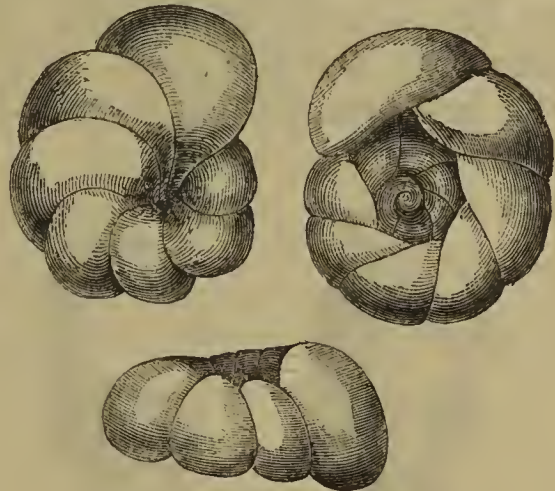


Fig. 139. *Rosalina Lorneiana*.

38. This is followed by two species of *Rosalina*, of which the first is *Rosalina Lorneiana* (fig. 139), common at St. Germain and Meudon, and rare at Sens and in England.



Fig. 140. *Rosalina Clementiana*.

39. The other species is *Rosalina Clementiana* (fig. 140), which, though very rare at St. Germain,



is stated to be more common in England. Morris gives Kent, Portsdown, and Charing as British localities.

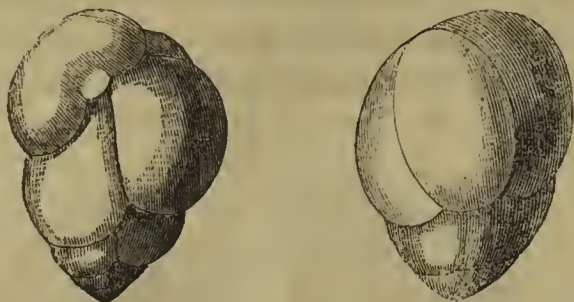


Fig. 141. *Valvulina gibbosa*.

40. *Valvulina gibbosa* is the only example given of that genus (fig. 141), which is said to be rare at St. Germain, and is not included in the British list.



Fig. 142. *Verneuilina tricarinata*.

41. *Verneuilina tricarinata* is another very rare species, according to D'Orbigny, from St. Germain and Sens (fig. 142), although it would not appear to be so uncommon as then supposed. It is recorded by Morris from Kent, Charing, and perhaps other localities in Europe.



Fig. 143. *Bulimina obtusa*.

42. Five species of *Bulimina* are given. *Bulimina obtusa* (fig. 143), which is very common at Meudon, but rare at St. Germain and in England. Recorded by Morris from Charing and the Chalk and Gault of Kent.

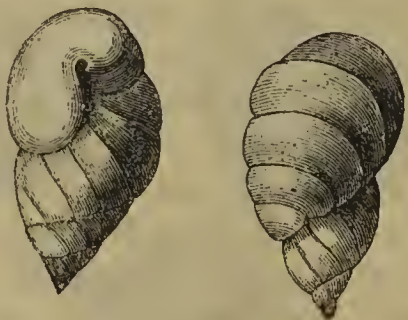


Fig. 144. *Bulimina obliqua*.

43. *Bulimina obliqua* (fig. 144), very common at Meudon, St. Germain, Sens, and in England, with

similar localities given by Morris as for the preceding species.

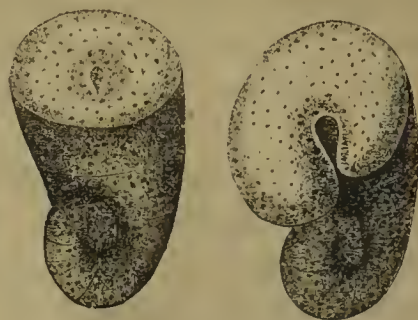


Fig. 145. *Bulimina variabilis*.

44. *Bulimina variabilis* (figs. 145, 146), said to be very common at Sens, rare at Meudon, St. Germain,

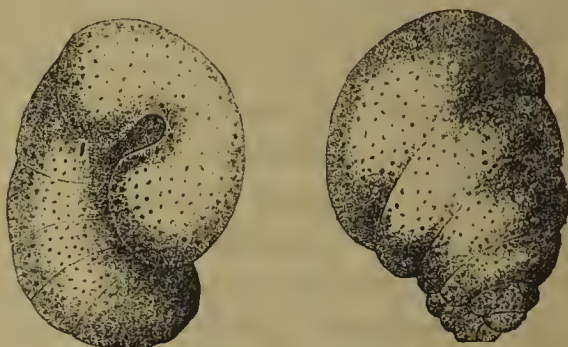


Fig. 146. *Bulimina variabilis*, var.

and England. Morris gives "Europe," as if it were widely distributed.

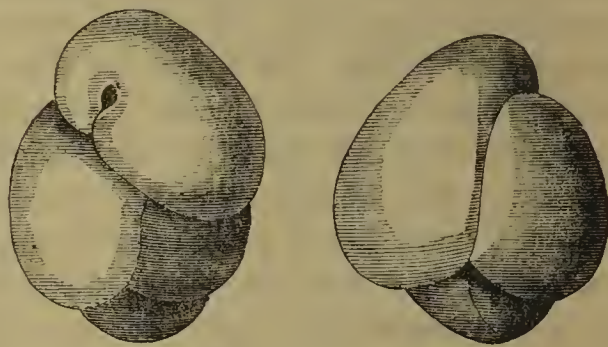


Fig. 147. *Bulimina brevis*.

45. *Bulimina brevis* (fig. 147), a very common species at Meudon, St. Germain, and Sens. Although England is not quoted by D'Orbigny, it is recorded by Morris in the Chalk of England and from Charing.

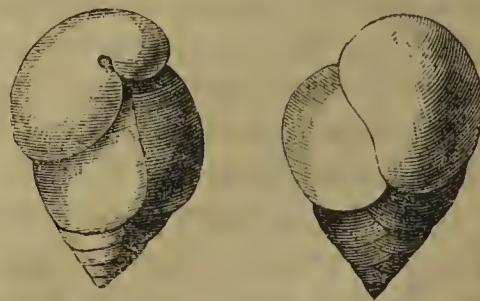


Fig. 148. *Bulimina Murchisoniana*.

46. *Bulimina Murchisoniana* (fig. 148) is stated to be rare at St. Germain, and in England. Thus all five species are included as British.

47. *Uvigerina tricarinata* (fig. 149), stated to be very rare at Sens, seems to be unrepresented in Britain.



48. *Pyrulina acuminata* (fig. 150), very rare at Sens and St. Germain, and common at Meudon, according to Morris is also found at Charing.

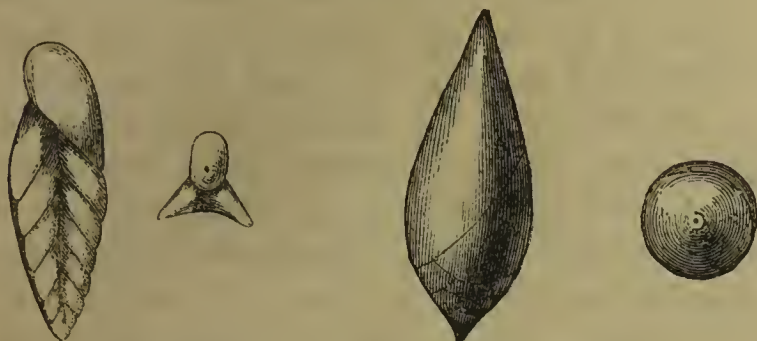


Fig. 149.  
*Uvigerina tricarinata.*

Fig. 150.  
*Pyrulina acuminata.*

49. *Gaudryina rugosa* (fig. 151), common at Meudon, St. Germain, and Sens, and, as it appears from Reuss in other parts of Europe, as well as at Charing, and in English Chalk.



Fig. 151.  
*Gaudryina rugosa.*

Fig. 152.  
*Gaudryina pupoides.*

50. *Gaudryina pupoides* (fig. 152), also common at Meudon, Sens, St. Germain, and in England, is recorded by Morris from the Gault at Folkestone, English Chalk, and Charing. This completes the *Helicostegia* group of D'Orbigny. The residue of species are grouped under the order *Enallostegia*, containing the two genera of *Textularia* and *Sagrina*.

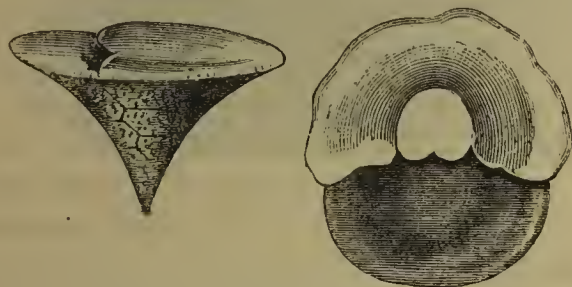


Fig. 153. *Textularia trochus.*

51. *Textularia trochus* (fig. 153) from Meudon; since alluded to by Williamson, and found at Charing, and in the Kentish Chalk.



Fig. 154.  
*Textularia turris.*

Fig. 155.  
*Textularia Baudouiniana.*

52. *Textularia turris* (fig. 154), not uncommon at

Sens, Meudon, St. Germain, and in England. Recorded by Reuss in Bohemia.

53. *Textularia Baudouiniana* (fig. 155), rare at Meudon and St. Germain, but included by Professor Morris from Charing, and the Kentish Chalk. Thus it will be observed that all the three species of *Textularia* are British.

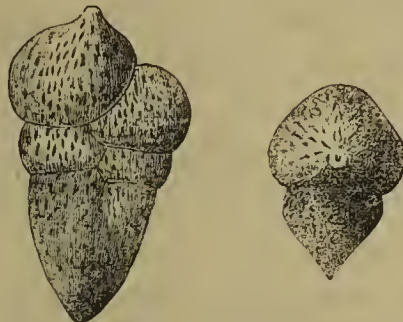


Fig. 156. *Sagrina rugosa.*

54. *Sagrina rugosa* (fig. 156). The only localities given by D'Orbigny are St. Germain and Meudon, whilst Morris adds Charing.

This brings us to the conclusion of the species figured and described by D'Orbigny in this valuable Memoir. As stated at first, we do not pledge ourselves to them as all good and distinct species; that is a point we will leave for discussion elsewhere than in these pages. Taking them as they are, we have fifty-four species, and of these no less than forty-five are recorded as British; hence five-sixths of the whole are British, and only one-sixth, or nine species are absent. We hope, therefore, that the figures we have given will prove of service to our readers, and stimulate some of them to work at these organisms, for good workers are wanted, and the field of operations is a wide one. Undoubtedly there are discoveries still to be made.

## THE HERRING GULL.

(*Larus argentatus*.)

THERE is something very refreshing in the change from the inland to the littoral; and there must be few indeed who have not experienced that delightful flow of spirits and quickened pulsation which always supervene when we leave the hot and dry and dusty country, and are brought gradually within sight of the far-resounding sea.

As we are whirled along by the express, the country becomes more bare and open; the woods gradually disappear; the song-birds are left behind, and gulls and peewits take their place; while through the open window, in spite of dust and steam, a delicious briny air comes rushing in, which at once dispels all sense of fatigue, and makes us long to get out, and breathe, and live in it. How complete and grateful is the change which modern locomotion enables us to effect in a few hours! Yesterday, perhaps, we were walking down Bond-



street, in all the discomfort of a London *toilette*, midst cabs and carriages, crowd and confusion. To-day we are sitting on the edge of Swyre Cliff, Dorsetshire, or on the summit of Beachy Head, dressed in an old shooting-coat and "wideawake," listening to the roar of waves, and the scream of gulls and guillemots!

With new scenes come new thoughts, and we forget entirely the busy throng which we have so lately left behind, or think of it only to regret that we must return to it.

The birds, the seaweeds, the insects, and the shells in turn engross our attention, and we find

the Greater Black-backed Gull (*L. marinus*) and the Kittiwake (*L. tridactylus*) are often found in the same cliffs with the Herring Gull; but, except in favoured localities (as, for example, at Lundy Island, in the Bristol Channel), these two species, in the south at least, are in the minority in point of numbers, and the Lesser Black-backed Gull (*L. fuscus*) is rare. Take a trip to Northumberland, the Farne Islands, and Holy Island, and you will find the case reversed. There the Kittiwake and Lesser Black-backed Gull are very numerous, and the Herring Gull is scarce. Further north—that is, in Scotland—we meet with the Common Gull

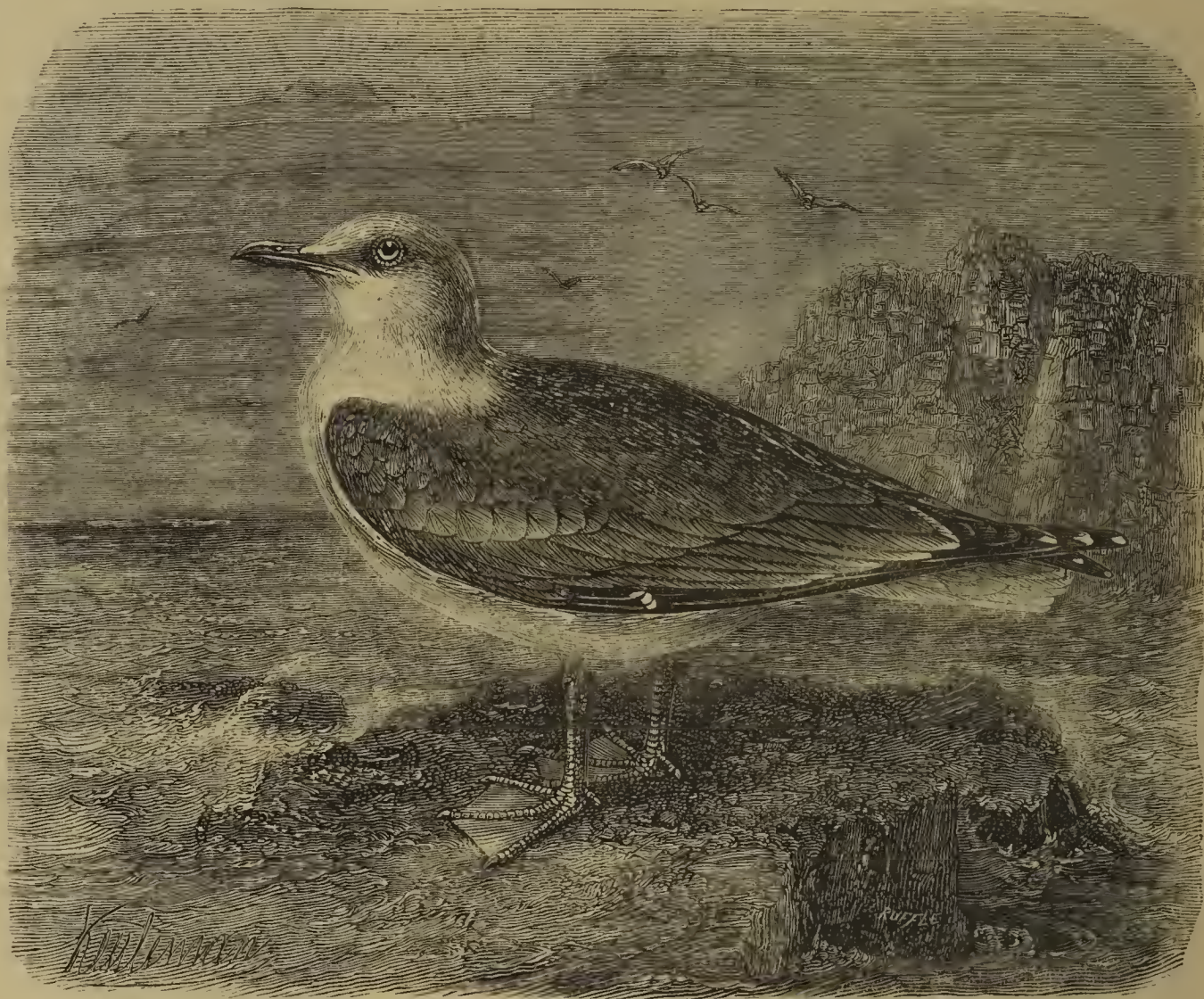


Fig. 157. THE HERRING GULL.

occupation for a whole day in the study of a single species.

Almost as a matter of course the sea-fowl, by their cries and conspicuous plumage, attract especial notice, and to the ornithologist no greater treat can be afforded than a visit to one of their breeding-stations during the time the birds are sitting.

The most widely-distributed of all the Gulls, probably, is the Herring Gull. During the nesting season this species may be found on all the rocky portions of our coast, but it is commoner on the west and south than on the east and north. Indeed, on the Welsh headlands, and throughout the entire range of cliffs from Cornwall to Sussex inclusively, this is the Gull most frequently met with. It is true

(*L. canus*) much more frequently than in England. The only other resident species of Gull to be mentioned is the Black-headed or Peewit Gull (*L. ridibundus*). This bird, however, does not breed in the cliffs as the others do, but makes its nest inland on the ground, and differs materially from its congeners both in haunts and habits.

The appearance of certain Gulls when at a distance is very deceptive. The Herring Gull, Kittiwake, and Common Gull, are frequently confounded, from the similarity of their plumage and the difficulty in estimating their size, except when near enough to be within shot. It requires a good glass and a practised eye to identify them at a long range. These three, in summer, all have the head, neck,



tail, and underparts pure white, the mantle grey, and the primaries black and white; but, on a near inspection, it will be found that the distribution of these colours varies in each, especially as regards the primaries; that the colours of the bill and legs are different; and that the birds themselves differ in size and structure.

In the Herring Gull the bill is yellow, with the angle of the under mandible red; eyelids, orange; irides, straw yellow; legs and toes, flesh colour. It would be difficult to choose a prettier study than a fine old bird of this species standing in bold relief against the dark limestone rock, a bunch of samphire at its feet, and by its side the large and comfortable nest, with its blotched and spotted eggs. The nest is usually made of dry grass, but a foundation is often laid of large dry stalks of heath or seaweed. We have seldom found more than three eggs in a nest, and having frequently counted but three young birds, it may be inferred that this is the usual complement. The young, when first hatched and lying still in the nest, so closely resemble the eggs in colour that it is difficult to distinguish or count them. It is not until they have begun to get the use of their wings that they become lighter in plumage, and it is evident that their parents must assist them to the water, for we have seen young gulls of this and other species swimming about with the old birds long before they could fly. They are three years in acquiring the adult plumage; and, in all probability, do not breed before this is fully assumed. We have looked in vain, during the nesting season, for immature or spotted birds amongst many hundreds of old ones.

From their habit of preying upon the herring fry, and other surface-feeding fish, they have received the name of Herring Gull. There is no doubt, however, that they are quite as omnivorous as others of the genus. Crabs and shrimps are daily items in the bill of fare, and mice and young birds are sure to be pounced upon when they come in the way. We have repeatedly seen Herring Gulls following the plough and seizing worms and larvæ from the newly-turned soil. It is reported also that this bird feeds on grain.

It is easily tamed, and will breed in confinement. The young have several times been reared in the gardens of the Zoological Society, and other instances have been from time to time recorded. A pair of these birds, which had recovered the use of elipt wings in the Gardens just mentioned, for several successive years took their departure in the spring and returned again in autumn. Whether they instinctively repaired to rear their young in the mean time, it is impossible to determine; but this was not improbably the case. We have heard of several instances in which tame birds of this species flew at large for weeks and months, returning at intervals to be fed by their owners.

The cry of the Herring Gull is not unlike that of the Common Gull, a sort of hoarse laugh or cackle, sounding like "*wa-agh-agh-agh*." Sometimes a barking cry is preceded by a prolonged squeal, like "*wee-e-e-kiark-kiark-kiark-kiark*," and is generally uttered when they are frightened from the nest.

The practice of indiscriminately shooting gulls for what is called "sport," and for the sake of gratifying a fashionable rage for feathers, cannot be too strongly deprecated, especially when it is known that the unfortunate birds are most persecuted at a time when they have eggs or young, because they are then more readily approached. Such a practice must inevitably lead to the total expulsion of many species from our cliffs. A rock without sea-gulls is shorn of half its beauty; and all true naturalists must rejoice that recent legislation has provided for the protection during the nesting season of the delightful birds whose companionship at the seaside adds so much to the pleasure of a walk.

J. E. HARTING.

#### AVIARY BIRDS.

AS it is now the season for birds, the names of a few for the aviary might be acceptable to some of the readers of SCIENCE-GOSSIP.

The Canary bird has always been a favourite,—gentle, familiar, and a good songster. An aviary is not complete without it; it is not only a good songster, but sings at all seasons, and charms us in the dullest weather with some of the finest tutored song the world produces; its song being an imitation of the Titlark, Woodlark, and Nightingale. The Norwich birds are best to keep, next are the Yorkshire, and last of all the German; for, although their song is good, they are often quite off of song in March, and seldom live more than two years in this country.

The Goldfinch, that sprightly, cheerful, and most beautiful of English songbirds, is ever busy, always doing something; singing, bathing, asserting his right, flying his rounds, &c. &c. Some of them will pair with the Canary, producing an incessant songster, having the vigour of the Canary and the sprightliness of the Goldfinch.

The Siskin is a brisk and lively little fellow. It has a peculiar song, but much inferior to the Goldfinch, whose form and lively habits it somewhat resembles; it creeps along the branches, and suspends itself after the manner of the Tomtit; it is the first to sing in the morning, and the last to cease singing in the evening. Although a bird of passage, it is seldom sick, and will live ten years in age.

The Linnet is a bird much esteemed for song, and in the month of May, taken from the field, is



somewhat handsome in feather, being altogether brighter than at other seasons of the year—the top of the head and breast a beautiful, bright red, and the beak blue; but, taken so late in the season, is useless and cruel, for few live, as they all, or nearly so, have eggs or young. Those taken at Michaelmas soon become tame, and sing the season through. An educated Linnet is a bird any one would make a pet. Last year I procured a nest of birds about ten days old, and brought them up under a Woodlark, one of which imitates the Woodlark to perfection: indeed the only note he has of the parent bird is the call. The Hon. Daines Barrington, in a letter to the Royal Society, mentions a Linnet taken from the nest when only two days old, that had not even the natural call. It was in the possession of a Mr. Matthews, of Kensington, who had taught it to articulate a few words, some of which the hon. gentleman heard.

There are other birds very worthy of notice for the Aviary, such as the Bullfinch, Bramblefinch, Reed-sparrow, Snow-bunting, Chaffinch, Yellow-hammer, Twite, Greenfinch, &c. All these birds should be purchased at the fall of the year; there is less trouble in getting them to live. Granivorous birds can be kept in the Aviary with insectivorous birds: many feed on the same food, and do well.

CHAS. J. W. RUDD.

#### THE MALVERNS.

THE Malvern Naturalist's Field Club have just issued the third part of their Transactions, and, for all who are interested in this locality, the two hundred and sixteen pages will prove a welcome volume. First of all we have a sketch of the proceedings of the club from its commencement by its President, the well-known "rector of Pendock," the Rev. W. S. Symonds. Then follows a sketch of the geology of the Malvern Hills, by Dr. Harvey B. Holl; this is succeeded by a notice of the forest and chace of Malvern, its ancient and present state, by the Vice-President, Edwin Lees, Esq., F.L.S., Dr. H. B. Holl also contributes some additions and corrections to the list of Lichens of the Malverns, and there is also a catalogue of the birds by Mr. Edwin Lees; of the land and fresh-water molluscs by Dr. Griffiths; of the insects, by the Rev. E. Horton, and meteorological observations, by W. and J. Burrow; with a paper on the forms and persistency of arboreal fungi, by Edwin Lees, F.L.S., &c. The general character of all these communications is excellent, in fact it would be a great blessing if every locality had chroniclers of equal ability, and equal spirit to publish their observations. There are several illustrations, but for the artistic merits of one at least of the plates of fungi we can say very little. The paper, chiefly occupied

by the Polyporei, is notable for two things, the one the declaration made in the descriptive character of *Polyporus*, that the "sporidia are contained in slender asci, and very small," and the other, the large number of new species described. Perhaps the suggestion that the alburnum of trees has "the metamorphic power of producing simulated forms of fungi, and that these sap-balls are not really autonymous plants, producing real spores from which similar plants can arise," might be added as a third notability. From rather rough descriptions, without the least indication of the colour of the spores, it would be presumptuous to offer an opinion of the new species. The discovery of asci in *Polyporus* is, however, a very extraordinary one, and, if established, must immortalize the author. And the suggestion that, like galls, these species of *Polyporus* are metamorphosed conditions of the tissues of the plants on which they grow has at least the merit of being novel, in whatever else it may be deficient.

So long as these local Natural History Societies confine themselves to local questions, and investigate local natural history, they will accomplish good work, and we can forgive them for a few mistakes. The Malvern Club has rigidly adhered to this principle in the volume before us, and the result is, on the whole, eminently satisfactory.

#### ANTHER SMUT.

(*Ustilago antherarum*.)

THE Smut which attacks the anthers of *Lychnis diurna* has been extremely prevalent this year, and in consequence we have been enabled to study it more effectually than has been possible to us hitherto. Amongst myriads of plants, we have found a single plant only of the male and female form respectively, in which, while some blossoms were attacked a few escaped. In most cases every flower was equally affected. In the male plant, and this only in the white-flowered variety, which is quite distinct from *Lychnis vespertina*, the unaffected flowers were in their normal condition, with scarcely a trace of pistil. In the female plant, though the pistil was partially developed, but in no case, as far as we could find, fertile, the stamens were uniformly developed in the affected flowers, and the anthers filled with the spores of the *Ustilago*: in the unaffected flowers there was just the same rudiment of stamens as are always visible in unaffected plants, and no further development.

It seems perfectly clear, therefore, that when the female plant is traversed by the mycelium of the fungus, there is a tendency to cause the development of the stamens, which takes place at the expense of the pistil, which is much reduced in size. There is not the slightest ground for considering it



a reversion, and the true explanation is undoubtedly that "the *Ustilago* penetrates the plant; but as it can only fructify in the stamens, it would appear to be the determining cause of the production of those organs in the normally female flower." We have planted affected female plants, and we shall be very surprised if any of them prove truly hermaphrodite, should they not be attacked by the fungus. Amongst thousands of unaffected plants we have not found a single one, after a long search, which combines both sexes.—*M. J. B.*, in *Gard. Chron.*, June 4, 1870, p. 763.

## ZOOLOGY.

**HAWFINCH'S NEST.**—Some of your ornithological correspondents may be interested in knowing that a very beautiful and perfect nest of the hawfinch (*Coccothraustes vulgaris*), with four eggs, has just been brought me. It was taken in an orchard at Almondsbury, near Bristol, built in the fork of a pear-tree overhanging a moat, and composed chiefly of elematis twigs, lined with vegetable fibre. The birds are not uncommon here in winter, but the occurrence of the nest is unusual.—*E. Wheeler*.

**DEILEPHILA LIVORNICA AT BRIGHTON.**—I have just seen a specimen of *Deilephila Livornica*, striped hawk-moth, on the setting-board. The insect, which is slightly rubbed, was taken on Tuesday, May 31st, near Brighton, by A. Gates, of Belgrave-street.—*T. W. Wonfor*, Brighton, June 4th, 1870.

**THE TOAD.**—The toad is a villainous beast. One day I observed one that had crawled beneath a hive; there, with his two forepaws advanced and his throat wide open, he attracted the innocent bees, with which his sides were distended.—*The Abbé Caillett*, in *Gard. Chron.*, p. 732.

**WEASELS.**—It sometimes happens that we witness actions on the part of the higher Mammalia which seem almost to indicate a reasoning faculty in them; and in illustration of this, I send you the following observation on the weasel (*Mustela vulgaris*), which happened to a friend of mine, the Rev. J. Monkhouse, of Church Oakley, near Basingstoke. He was driving along a road between Basingstoke and Old Basing, at the beginning of last month, when he saw one of these little animals crossing the road in front of his horse; it was apparently an adult specimen, and, before he could prevent it, the horse accidentally stepped on the animal, and thereby injured it, apparently in the spine, as its hind legs seemed to become paralyzed. On his continuing to watch to see how much it was hurt, and what would happen next, he was surprised to see another weasel come up to its assistance from the other side of the road, and, after carefully inspecting the invalid, pick it up in its mouth and carry it off to the side of the road from whence

it had emerged, apparently having fully comprehended its companion's misfortune, and its inability to get unaided into a place of safety.—*H.*

**STRANGE BEES** (p. 141).—I also thought I had discovered a new kind of bee, for I saw a great number with the hairs upon the upper part of the thorax of a bright orange colour. These puzzled me. They were evidently hive bees by their shape, but they appeared day after day, and were all coloured exactly alike. I have never seen Ligurian bees, so at first I thought they might be that kind. However, on watching them carefully the mystery was solved: they were the common hive bee, probably my own, and they were foraging on, or rather in, the flowers of yellow broom, which is just now in perfection; and the cause of their yellow appearance was this:—The stamens and pistil of the broom are curved upwards in a remarkable manner, forming a series of almost perfect circles; and as the bees pushed their way into the base of the flowers to sip the honey, the anthers exactly reached to the bees' shoulders, and rested there. So the bees could not help carrying off the pollen to other flowers and other broom-trees, thus unconsciously assisting the important process of cross-fertilization. Most likely the appearance described by "A. W." was caused in a similar way.—*Robert Holland*, June 2nd.

**THE DEATH'S-HEAD MOTH** (*Sphinx atropos*).—We are a great potato-growing people in my parish, in which all the cottiers have allotment ground, which is yearly devoted to the growth of this esculent. From these plots we have had year by year from two to half a dozen of the larvæ of the Death's-head Moth brought to us, for, being known as a lover of "queeriosities," for which we are not unwilling to spare some few of her Majesty's medals done in copper, these exquisite caterpillars are sought after and so found. We are inclined to think that the species is much more common than is supposed, and we offer this hint to the dwellers among potato plots.—*J. B., Bradford Abbas, Dorset*.

**THE NEW BRITISH SHELL** (*Zonites glaber*), of which there are two notices in your June SCIENCE-GOSSIP, one by Mr. Jeffery, the other by the finder, Mr. Rogers. It may be interesting to many of your readers to know a few other localities where I have found and received it from. In 1862 I received it from Leeds; in 1864 my son took it at Guernsey; in 1868 I took it at Bristol; same year near London; in 1869 from Jersey; and I have no doubt it will be found in many collections, where it has been mistaken for Mr. Jeffreys's var. *Z. compacta* of *cellarius*, which shell it approaches very much, but the mouth is more open. I shall be pleased to give information to any one who would like to forward their specimens to me. *W. Rich*, 14, Great Russell Street, Bloomsbury.



## BOTANY.

MUTATION OF SPECIES.—A very curious fact has just come to my notice. A correspondent kindly sent me, through the Editor of SCIENCE-GOSSIP, some abnormal flowers of Fuchsia, and with them some flowers of a species of Fritillary, to which the following description was appended:—"I enclose also two Fritillaries, to show you the effect produced by *either* change of soil or transplantation to a garden. These Fritillaries are the descendants of some sent to us many years ago (about ten, I should think) from the meadows near Oxford. They were then mottled in the usual way, in a pattern of *small squares* of darker and lighter colour, like a small chessboard, and were, to the best of my recollection, *exactly* like some I have lately seen in Berkshire, in meadows near the Lodden; of the same colour *inside* and *outside*, and that of a richer hue than the outside of these flowers now present (*i.e.*, with more crimson in it). They have increased with us very freely, but have all changed in the same manner." On opening the box I saw at a glance that the flowers sent were not those of our wild *Fritillaria meleagris*, but apparently those of *F. Pyrenaica*, a species only found wild upon the Continent, but which is sometimes seen here in the gardens of the curious. It is not by any means so ornamental a plant as our meadow Fritillary, from which it is readily distinguished both by the form of its flowers, which are more campanulate, having the tips of the perianth slightly recurved; and by its colour, which instead of being pink and chequered, is of a dull brownish purple, with a sort of bloom on the outside, and the tips of the petals tinged with yellow. In Cheshire, I see the plant occasionally in gardens and I have heard it called "widows," which is a name given in various places to several kinds of dark-coloured and dull-looking flowers. I thought it possible that my correspondent might have had plants of *F. Pyrenaica* as well as of *F. meleagris*, and that they had become mixed or crossed, or that the latter had been lost; but, on inquiry, I find this not the case. My correspondent says:—"My father, who is interested and observant about his garden, confirms my belief that we had *no Fritillaries at all* here until a friend at Oxford sent us a supply from the meadows there." She further adds that "several have been planted out in the pleasure-grounds, some of them in sunless and damp situations, and all have changed in the same manner. The only other Fritillaries we have are *white* ones, sent, together with the coloured ones, from Oxford; and a few (also white) which I brought the other day from Berkshire." . . . "The white, so far as I am aware, remain unchanged." I feel quite satisfied in my own mind that no mistake has been made; but as this is a very strange and unusual

circumstance, I shall look forward to a fresh supply (and a supply of fresher flowers) another year for further observation.—*Robert Holland, June 3, 1870.*

THISTLES are making their way at the Antipodes. A correspondent of the *Otago Daily Times*, who, during one day's journey, met with a few thistles growing here and there by the wayside, on the next day entered a district in which, for over forty miles, this acclimatised weed seemed to have fairly taken possession of the land. "Now, æsthetically considered," this correspondent observes, "a thistle is a tolerably handsome object, and has an air of independence about it possessed, perhaps, in an equal degree by no other plant; but there is a place for everything, and, no doubt, the farmers in this part of the country have every reason to complain of the apathy which allowed the thistle to become such a nuisance. Spreading from a small point to the north of Hampden, where it is said to have been introduced by a flock of sheep, the thistle is now to be found all over the valleys of the Shag, Otepopo, and Kakanui, comprising some of the finest agricultural land in the colony; and not only in the valleys, but to the tops of the hills, not a spur or a gully being without its hundreds. This nuisance has now reached a point at which all the thistle prevention ordinances in the world will fail to prevent its spread. Slowly, but surely, it will work its way to the southward and westward, until it has overrun the province.—*Gardeners' Chronicle, June, 1870.*

IRREGULAR PRIMROSES.—In SCIENCE-GOSSIP for last month (p. 139) W. H. Grattahn mentions his having discovered at Torquay a flower of the Primrose with eight petals. During the spring of last year, when in Somersetshire, I constantly came across primrose-flowers having sepals, petals, and stamens varying in number from six to twelve, many of them with two distinct pistils. The sepals, petals, and stamens in the same flower did not always correspond in number; for instance, in one case there were nine sepals, ten petals, and eleven stamens, and in another, ten sepals, nine petals, and nine stamens. It may further be remarked that those flowers with two pistils, in many cases, had fewer sepals, petals, and stamens than those in which only one pistil was present; thus a flower with seven sepals, petals, and stamens, had two distinct pistils, whilst one with eight sepals, petals, and stamens had only one. In another specimen with eight sepals, petals, and stamens, the stigma was bilobed.—*J. F. D.*

THE EVENT OF THE MONTH is the publication of Dr. Hooker's "Student's Flora," of which botanists are speaking in glowing terms.



## MICROSCOPY.

IMPROVED TURN-TABLE.—It may be of interest that I should describe briefly my new form of turn-table, or cell machine, by which slides are held and centered, as regards their width, at the same time leaving their surface entirely free, so that two, three, or more cells may be formed in their length. Every

towards (and moving) C, the other end of C—*i.e.* D—is moved *exactly* as much in the opposite direction until they approach near enough to grasp the slide by its edges. The length of the wedge must, of course, be such as to provide for about  $\frac{1}{8}$  of an inch variation in the width of slides. It will readily be seen that the slip may be pushed in either direction excentrically lengthwise, so as to allow of the

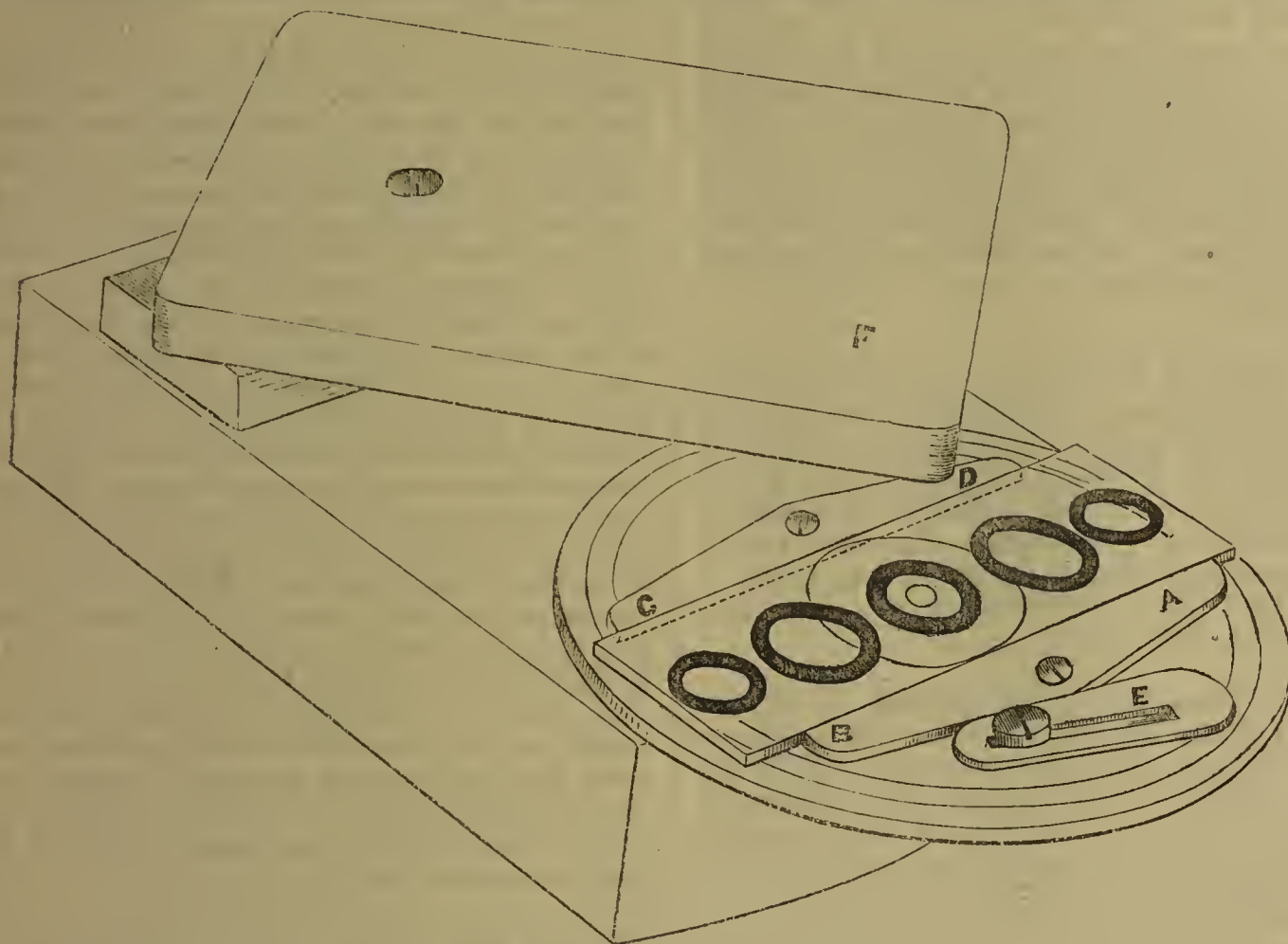


Fig. 158. Dr. J. Matthews' Turn-table.

one who has used the present machine must often have felt the inconvenience of the springs; sometimes too strong, at others too weak, always in the way, catching the fingers or the pencil, and limiting the number of cells. Centering is also so uncertain that several ingenious remedies have been proposed and used with varying success: but none have entirely supplanted the old form devised by Mr. Shadbolt, now in use. My plan is simple in the extreme, consisting of two jaws of the average thickness of a glass slide,  $\frac{3}{8}$  of an inch wide,  $2\frac{1}{2}$  long. Each of these is pivoted on the face of the turn-table by a screw through its centre, each screw being placed exactly equidistant from the centre of the turn-table, so that the jaws are separated by a space as wide as an average slide; *i.e.*, a full inch. Outside of that space, on one side of the centre of one of the jaws, is a wedge fixed by a screw, in such a way as to be capable of motion in the direction of its length by a slotted hole. This is all the machinery. A B and C D are the two jaws, E is the wedge. On placing a slip between the jaws they probably at first do not touch it. If the wedge be then pushed so as to approximate B to C, the jaws move on their centres, so that, however far B may be pushed

formation of any number of cells, all of which *must needs* be central as regards their width, if the instrument has been accurately made, which is a very easy matter. I have added also a rest for the hand, F, which may be turned aside on a centre at will, and which I have found to be a great convenience. I am informed by several persons that its price need very little, if at all, exceed that of the old form.—*J. Matthews, M.D., at Quekett Club.*

HORNET'S TONGUE.—I do not remember to have seen noticed in SCIENCE-GOSSIP the curious structure of the tongue of the Hornet, which it may interest some of your readers to examine more closely this summer. Though the general features of this organ are very well displayed in the purchased slides of the tongue prepared in Canada balsam, it is only in the fresh specimen, or one prepared in fluid, that the actual structure can be satisfactorily discerned. It appears to me to be composed of a number of tubes running parallel to each other, and from which proceed at right angles and equal distances, a number of open-mouthed pipes, very much like certain musical instruments.—*R. H. N. B.*



## NOTES AND QUERIES.

**PRESERVING WOOD.**—In the *Annales du Génie Civil*, of April last, Dr. Reinsch gives the following directions for rendering wood difficult of combustion and preserving it underground:—The wood, unplanned, is to be placed for twenty-four hours in a liquid composed of one part of concentrated silicate of potassa and three of pure water. After being removed and dried for several days, the wood is again to be soaked in this liquid, and after being again dried, painted over with a mixture of one part of cement and four parts of the above liquid. When the first coat of this paint is dry, the painting is to be repeated twice. This paint mixture should only be made up in small quantities, as it rapidly becomes dry and hard. Wood thus treated becomes unflammable, and does not decay underground.—*Chemical News*.

**HERB PARIS.**—I have found to-day, in Ladywood, near Folkestone, Herb Paris (*Paris quadrifolia*), with the following arrangement:—leaves 6, sepals 5, petals 4. I should be glad to know if this has been previously noticed. I found near the same place a Dandelion (*Taraxacum dens-leonis*) with two flower-heads on the same stalk, both quite at the top, so that there was no division of the stalk.—*C. L. Acland, Folkestone*.

**WINGLESS INSECTS.**—I beg to thank Mr. Spicer for his reply to my invitation to a friendly gossip on the above subject, and quite agree with him in his appreciation of that great entomologist, Hermann Burmeister, as well as in thinking that "technicalities and hard names" should, when possible, be avoided in writing for the pages of SCIENCE-GOSSIP. Still, however, I consider that the request of the editor to use "common names" is not intended to apply in every case, but only in those instances (as I said before) where "common" (in the sense of "generally known and accepted") names are in existence. Moreover, I think that Mr. Spicer will find, if he asks collectors what moth they understand by the "Chimney Sweeper," that nine out of ten will reply, "*Tanagra chærophyllata*," and not "*Fumea*." In regard to the detestable Pediculids, there has been at various times much controversy regarding their proper location. They have several times been placed among the *Hemiptera*; in which order the latest writer on the classification of insects (Dr. Packard, who, by the way, includes the Spiders and Myriapods among the Insecta, thus affording Mr. Spicer, if he pleases, a host of examples of "wingless insects") retains them. Other naturalists have placed them among the Myriapods; but what their proper situation is has not yet, I think, been satisfactorily shown. One word with regard to the "animal whose body is divided into three segments," &c., which, unless "three" be a *lapsus calami* for "thirteen," or "segments" for "divisions," is surely a creature of Mr. Spicer's own imagination. My belief was, and is, that all insects have their bodies divided into thirteen segments, which (in the perfect state, at least) are arranged in three divisions,—head, thorax, and abdomen. With regard to *Anisopteryx*, I am not aware that in any recent list, either British or Continental, is *Hybernia leucophæaria* included in it; indeed, by one great continental authority, Dr. Herrich-Schäffer, the genera *Anisopteryx* and *Hybernia* are placed far apart; while in all other modern lists in which these two genera are placed in the same family, *leuco-*

*phæaria* is separated from *Anisopteryx* by three other species of *Hybernia*.—*F. Buchanan White, Colvend, Dalbeattie*.

**A FIELD OF BARLEY GROWN FROM OATS.**—It was a large field of barley grown from oats. The barley sown in this field was the first-born offspring of oats. The head and berry were barley, and the stalk and sheaves were oats; and the whole process by which this wonderful transformation is wrought is simply this and nothing more:—The oats are sown about the last week in June; and before coming into ear, they are cut down within one inch and a half of the ground. This operation is repeated a second time. They are then allowed to stand through the winter, and the following season the produce is barley. This is the plain statement of the case in the very words of the originator of this process, and of this strange transmutation. The only practical result of it which he claims, is this, that the straw of the barley thus produced is stouter and stands more erect, and therefore less liable to be beaten down by heavy winds or rain. Then perhaps it may be added, this oat-straw headed with barley is more valuable as fodder for live stock than the natural barley straw. But the value of this result is nothing compared with the issue of the experiment as proving the existence of a principle or law hitherto undiscovered, which may be applied to all kinds of plants for the use of man and beasts. If any reader of these notes is disposed to inquire more fully into this subject, I am sure he may apply without hesitation to Mr. John Ekins, of Bruntisham, near St. Ives, Huntingdonshire, who will supply any additional information needed.—*Extract from "A Walk from London to John o' Groats," by Elihu Burritt*. Can any correspondent explain this?—*T. C. O.*

**TOADS AND BEES.**—I am of opinion our friend Mr. George Guyon, in SCIENCE-GOSSIP, need be under no apprehension of damage to his toads and frogs by their making a repast upon bees or wasps. I have fed them, and repeatedly given both insects, without ever having noticed the least harm to arise, although they have often been stung in the mouth, and the wasp or bee has hung by the sting for a moment, but they have been almost instantly swallowed, with no indication of damage, or even any appearance of pain. It would seem, then, that the sting of these insects has no injurious effect; but if it has, I have not perceived it. Both animals, by attention and feeding, may be rendered tame and almost familiar. A very excellent and correct account of the mode in which the frog takes its food is given, by the Rev. W. T. Bree, Allesley Rectory, in the *Magazine of Natural History*, vol. iii. p. 326, July, 1830, and also in vol. i. p. 479, of frogs being kept for the purpose of prognosticating the weather.—*W. P. N.*

**COWSLIP.**—I have been told that euzlippe in the Saxon, the old name of this plant, comes from the fact that the flower grows in pasture lands, where it often meets the cow's lip. Your correspondent will remember Ben Jonson's lines,—

"Strew, strew the glad and smiling ground,  
With every flow'r, yet not unfound  
The primrose drop—the spring's own spouse,  
Bright day's-eyes, and the lips of cows,"

and "Paigles," from palsey wort, *Herba paralysis*. In the olden time the cowslip was deemed particularly efficacious in all paralytic affections.—*Helen E. Watney, Upper Norwood*.



PRE-HISTORIC REMAINS.—The great storm which visited Ballycotton on the last day of the last year, washed away a large portion of the bog and surface shore along the north shore of the bay. An examination of the strata laid bare by the waves has resulted in the discovery of numerous pre-historic remains—split bones, shells, &c.—in fact, a large Kjoenkemoedding. The discovery is attracting the attention of the antiquaries and geologists of Cork.—*The Standard*, June 14.

TUNNELLING BEES.—Whilst visiting at a friend's residence a short time ago, I was shown what struck me as a rather curious circumstance. There happens to be a raised bank of turf against one side of the house, and this embankment was literally perforated by the tunnels of a small bee, the tunnels being in no part more than a quarter of an inch distant from each other, and running, as I was told, about three feet from the surface underground. The occupants might be seen issuing in great numbers continually from these tunnels, and as I watched them, the thought occurred to me how it was possible each bee found his own tunnel again, among so great a number, all presenting the same appearance, and so closely arranged together. After a short chase, I succeeded in capturing one, but possessing, unfortunately, but little knowledge of Entomology, I was unable to decide as to what order they might belong. I was inclined to think at first that it might be the lapidary bee (*Bombus lapidarius*), having, as well as I remember, somewhat of that insect's general appearance. Referring, however, to that excellent work, "Homes without Hands," I find it does not bear me out in my supposition. What astonished me most was, that this spot in the garden alone seemed to have been chosen by the bees; hardly a single tunnel could I discover, even as much as a few yards distant from the bank. I should feel much obliged if any of your correspondents could give me any information on the subject.—*J. S. William, Durham*.

ON SOME ANOMALIES OF SPEECH.—A *Chart*, or sea map, is a *carte*—i. e., a card; it is a relic of the Greek *χάρτης*, applied to a leaf of papyrus prepared for writing, and from *χαράσσω*, "to cut by furrows, to plough," an allied word, we have *character*, in the sense of an inscribed mark. Literally, *Chart*, with us, means a thick sheet of paper. A *Map* is said to be derived from a Phœnician word, adopted by the Romans as *mappa*, the equivalent to what we call a napkin; but it is very probably only a Semitic form of the original word papyrus, the *m* being intrusive; as in the Celtic *mab*, derived from *abba*, father—i. e., *pater*. Both words, it will be seen, present this anomaly, that they carry us back to the *material* used, and throw no light whatever upon the mode of constructing or laying down maps and charts, or to the uses for which such things are designed. In the one case, *chart*, from *χάρτης*, a prepared sheet of papyrus, carries us back to the material—"paper"; but paper, so well known to us now, is from the Greek *παπύρος*, the *Papyrus antiquorum*, an aquatic plant of ancient Egypt, a sedge or bulrush, now extinct (?); but the *Cyperus papyrus*, an allied plant, is well known. The stem of this plant was cut vertically in thin slices, which adhered on pressure when in a moistened state: numerous specimens may be seen in the British Museum, called papyri, or manuscripts. In the other case, the word *map* carries us back to the first idea of manufacturing a writing material out of textile fabrics.

It was, apparently, the invention of Phœnicians, and the product, in reality, a piece of linen—in nursery language, a "nap." In the present day, the most durable maps for travelling use are printed on fine linen; while paper is now made of any material that can be obtained cheap enough to pulp together for the purpose,—such as chopped wood and metal filings, straw, old rags (the most costly of all), tow, hemp,—pure cotton paper being a great rarity. The same anomaly of substituting *material* in place of use runs through most allied words; as in our word "Bible," from the Greek *βύβλος*, which is only another name for the papyrus; and our word "library," from the Latin *liber*, "the inner bark or rind of a tree," used for a similar purpose to the papyrus; and our own word "book," similarly derived from the Anglo-Saxon word *boc*, "a beech," when used in primitive times for a like purpose.—*A. Hall*.

SUGGESTION.—Our present floras are mostly too cumbersome for use in the field. I have long wished that the author of some one of these floras would bring out two or more of the families in a detached form. If this could not easily be done, then why not print the floras so that students might split up the volumes for themselves?—*R. T., M.A.*

BORRAGO.—Throughout his recently-published admirable "Student's Flora," Dr. Hooker spells our old friend *Borago* and its compounds with the reduplicated *r*. I am aware that in Italian we have borragine, in Spanish burraja, and in Portuguese borragenis, but I have not met with the above form in Latin writers, nor in other English floras. Is not the root of the word the Greek *βορά*, food?—*R. T., M.A.*

RARE PLANTS AT TORQUAY (p. 139).—If Mr. Grattann will turn to vol. iv., p. 281, he will find that *Asplenium Ruta-muraria* is (or was at the time I wrote the paragraph in question, in which are two or three typographical errors) to be found at Anstis Cove. I also found specimens in Daddy Hole, near Torquay, which I at first took to be fronds of a rarer fern. I well remember, on the occasion of my first expedition in search of ferns, finding, as I thought, *Gymnogramma leptophylla*, which I had heard might possibly occur in the Isle of Wight. The fronds agreed admirably with the drawings in my handbook, but my plant was merely a seedling *Lastrea*. It is imperative in most cases to have the fronds in fruit.—*R. T., M.A.*

CONFERVÆ IN AQUARIA.—As a successful grower for several years, I will let "C. L. C." know how I kept my plants free from the disfiguring appendage. I have sponged the jar regularly; drew each leaf through the fingers, and kept snails; but to no purpose. The only plan of any use, and fortunately it keeps the plant in vigour as well as beauty, is to change the water frequently. Put the jar under a tap, and let the water run in for as long a time and as often as convenient. Soft water is the best, and if a few degrees warmer than that which is already in the jar so much the better; yet I have pumped into mine for half an hour at a time in summer weather, without doing any apparent injury to the plants. I may mention that although I pumped pretty often, yet a colony of polyzoa made their appearance. In an article which appeared some time since, the writer, in describing the gathering of *Chondrus crispus*, spoke of its being much mixed with *Valisneria spiralis*. Surely he meant the *Zostera marina*.—*H. J. Bacon*.



ROOKS AND ARUM MACULATUM.—In consequence of the long drought, the rooks in this neighbourhood are in a state of starvation, and have been driven to every kind of shift to find food. Among other things they have hunted every bank, even by the roadsides, for the roots of *Arum maculatum*, which they have devoured in large quantities. I should like to know if this very unusual circumstance has occurred elsewhere.—*J. G. N., Aldborough.*

VALISNERIA SPIRALIS.—Some few years ago I was troubled with exactly the same growth that "C. L. C." complains of, and only got rid of it by strongly reinforcing my squad of snails (*Planorbis corneus*). I fancy that its appearance shows the plants are not in a properly healthy condition, for at the present time, although (except upon the front glass) I allow confervæ full scope in my aquarium, the *Valisnerias* are perfectly free from anything of the kind, being luxuriant to a high degree, and flowering every summer.—*Edward Banks.*

FOXGLOVE (*D. purpurea*).—Errata, pages 135-6, SCIENCE-GOSSIP. Instead of "cups," read "caps;" instead of "cattle-loosing," read cattle-loving; instead of "frill-bodied," read full-bodied; instead of "foxglove heel," read foxglove hell. The references of "R. T., M.A.," p. 115, show a very ancient use of the name foxglove, especially Fion camglata, and I think we have still to learn that there is a connection between this plant and the fox, as well as between it and the "good people." In the true Celtic portions of Ireland the fox, though equally detested with the fairies, is almost equally held in fear and reverence. In West Mayo and Donegal, where the Celtic element is still pretty pure, great dread and reverence is paid the fox. He is never called by name, but always as the "red fellow," the "gentleman," &c.; and for this reason, that, like the fairies, if called by name, he would spitefully kill every duck and fowl of the hardy individual who dared to invoke him; so the fox, like the fairy, is believed always to be lurking within earshot, though concealed from view. Most nations have a sobriquet for the fox, and whether they originated in superstitions or otherwise, it would be hard to tell. In ancient Celtic mythology due respect is paid the fox. Perhaps some one better read on this subject than myself will favour us with the connection between the fox and the fairies, for a strong connection I have no doubt once existed. The deciphering of the name foxglove, if not a corruption of "folks," or "fuchs" gloves, must be sought in fairy or mythological lore. Fion camglata reminds me of a practice of my Celtic countrywomen, of laying wool on the bushes for the fox, and even going so far as to make mittens out of lambs-wool for his feet—laying them at the den. This—ridicule not, English reader, for you are not much ahead of us—is to propitiate the fox, and act as an offering of good-will; for being imbued with a certain amount of honour he will not kill the fowl of the foolish Doreas, but will encase his feet in her mittens on his cold night tramps. This certainly shows that in the Celtic portion of Europe foxes did wear gloves.—*H. B. K., Co. Dublin.*

FLORA HAUTONIENSIS.—In the "Annual Hampshire Repository" (1798), vol. i., pp. 114-122, is an article headed "A Hampshire Flora, or List of rare Plants, arranged according to the Linnean System, with their Habitations, and References to Modern Plates." The introduction closes with the words:

"The following commencement only of a Hampshire Flora, confined at present to some of the rarer plants, hereafter to be continued and to be finally extended to a complete Flora Hautoniensis." Then follows a long list of plants, extending to the Isle of Wight district, and the whole is given out as the work of "L. S. S." (? Linneanæ Societatis Socius.) Can any reader inform me who the author was, and if the list was ever continued?—*R. T., M.A.*

ARBUTUS UNEDO.—Of this, Parkinson, in his "Theatrum Botanicum" (1640), pp. 1489, 90, says: "It hath beene of late dayes found in the west part of Ireland of a reasonable bigge sise for a tree; but with smaller fruite." In the "Cybele Hibernica," p. 81, the quotation closes at "Ireland," and there is an error of 1680 for 1640 in the date.—*R. T., M.A.*

COWSLIP (p. 141).—I can only state this month that the word occurs in the "Nominale" (see Plant Names, p. 127), hoc ligustrum = a primerose and a cowslowpe. In the "Pictorial Vocabulary," hoc ligustrum (Anglice), a prymrose; hoc ligustrum a cowyslepe. In the "English Vocabulary," hæc pimpinella, hoc ligustrum, hoc-pringrius primerolla, hoc vaccinium cowsokulle, on which Mr. T. Wright observes, apparently another name for Cowslip.—*R. T., M.A.*

A SNAKE-KILLING IGUANA.—A few days since (says the *Wagga Wagga Express*) as Mr. B. Best was riding through the bush in the neighbourhood of Sandy Creek, he observed a monster iguana blundering in alarm somewhat slowly up a tree. Remembering that one of the men upon the station wished to procure a supply of the noted bush remedy for rheumatism—iguana oil—he dismounted from his horse, and by a well-directed shot with a stone, succeeded in bringing the reptile to the earth, and then put an end to its existence with a stick. Throwing it over the saddle, he remounted and set out for home; but after riding a short distance observed with no little alarm that the long form of a snake was gradually dropping from the mouth of the iguana. He lost no time in casting off both from the saddle, and upon after examination discovered that the snake was quite dead, and indeed had most probably been killed before the process of swallowing had been commenced. The iguana measured from nose to tail five feet, and the snake, which was one of the black species, three feet one inch in length. As a natural and useful enemy of the snake, the iguana should be preserved from destruction.—*From the Kiama Independent.*

BEES AND WASPS.—DO TOADS EAT THEM?—I am glad to see in the SCIENCE-GOSSIP, a paragraph now and then on the honey-bee. In the winter of 1868, mice found their way into our Apiary here, and proved very destructive; and I tried to fix the hives so as to render it impossible for the mouse to get access to them. This I succeeded in, by placing each hive separately and singly (not upon a common floor or shelf, but) upon a tripod or triangle supporter of three common glass bottles; this effectually prevented those enemies; but I observed that the nearness of the hives to the earth exposed the bees to an enemy nearly as bad, viz., the Toad. Go when I would, towards night, and even after dark (sometimes at a very late hour), I found toads standing before and below the entrance, and catching and swallowing the bees by wholesale; this has been repeatedly noticed. I have sometimes taken one of



these toads to a wasp's nest, thinking they might prove a useful auxiliary in destroying some of them, which I take to be about the very worst enemy which the honey-bee has; however, the toad would have nothing whatever to do with them (the wasps), and seemed to turn from them with fear or disgust.

**BEES.**—Here (in North Wales) the cottager when hiving his swarms of bees sings to them. Ringing of the new swarm is scarcely known and very little practised here, though in South Wales it is, as in England, commonly practised. The Welsh are particularly clever in adapting means to any emergency. Now, it will occasionally happen that no such thing as an empty hive is to be bought, begged, or borrowed of all the neighbours round. Well, what is to be done? The following I have seen used on such occasions—one of the small tea-chests, and the bees took to it very well; also a small gunpowder barrel comes in on such occasions very useful. There are some of them in this village, and thriving uncommonly well, too. I have also heard of, though I have never seen, a large sugar hogshead being used for one, in which the stock has continued and extended, but without casting off a swarm for several years.—*W. P., Llandderfel.*

**BEES** (p. 151).—In reply to "E. S." there can be no doubt but that the syrup with which he fed his bees became acidified, and acting on his zinc trough produced acetate of zinc, a powerful poison. I am no bee keeper, but if I were, and fed them from food in zinc troughs, I should be especially particular that they be made thoroughly clean daily, and that the syrup (which could be prepared about once a week) be kept from air and light until used.—*W. D. H.*

**BEES.**—In answer to "E. S.'s" query about zinc feeders, I would say that that had nothing to do with the fate of his bees, as I have always used them with no evil result, and I know many others who have done the same. The cause of the death of his bees was possibly the old age of the queens, or it has been lately supposed that evil effects arise from feeding bees with loaf sugar; and should such have been the case, I beg to refer "E. S." to the *Journal of Horticulture* for Thursday, April 28th, the paragraph entitled "Bee Epidemics," p. 315. With regard to the bees having been robbed and murdered, there is no accounting for it for certain, and could only have been prevented (if noticed quite in the commencement) by shutting up the entrance so as only to admit one bee at a time; however, this does not always succeed. About this time bees often lose their queen, and when she has dwindled away, leaving no brood in the hive, as, for some time before her death, she ceases to lay eggs (although plenty of honey), the bees do not miss her in the way they would were she taken from them under ordinary circumstances; but they will not work and may be seen idly clustering about the entrance, but their position is soon found out by other bees, to whom (sometimes) they join themselves, but will often defend their own to the end. When bees lose their queen in this way, they will soon rear another if a piece of comb containing eggs and brood be supplied to them from another hive. This is a calamity which is seldom noticed, though it often happens, as will be seen from the fact of old queens leading off first swarms; therefore one queen may lead off three, perhaps four swarms in her life, but will in all probability die the following spring.—*G. C. G.*

**HOW TO SEPARATE FORAMINIFERA FROM CHALK AND SEA-SAND.**—Will any correspondent kindly give full and plain directions for the thorough separation and cleaning of Foraminifera from chalk, and also for removing the minuter ones from sea-sand, without the trouble of picking them out. It has been written that if the sand be dried and thrown into water the shells will float, and the siliceous particles sink to the bottom, but I have not found this effectual in practice.—*Henry Lee.*

**WASHING CHALK FORAMINIFERA.**—I have adopted the following method, with, I think, tolerable success. Take about one ounce of chalk—that which lies in powder at the base of a chalk cutting is preferable,—place it in a quart bottle with about a pint of water, shake it, and after a few moments pour off the milky fluid down to about one fourth; add more fresh water and continue the shaking and the pouring off, waiting longer each time for the *débris* to settle. If this washing is continued through ten or twelve times in one day, and afterwards repeated two or three times a day for a day or two, the final result will be a sediment entirely composed of Foraminifera. By this means I have obtained slides in which nothing can be detected as mixed with the Foraminifera. If small fragments of chalk remain mixed with the Foraminifera, that will give evidence of insufficient shaking. Plenty of water and plenty of shaking is sure to produce satisfactory results.—*M. C. C.*

**HORSETAIL SPORTS.**—It may be worth while to note two curious sports of the common Horsetail found by me on the warren. Each has developed a fertile head halfway up a barren frond, and one of the two has a second fertile head at the top of the barren frond. In both, the whorl below the fertile head, in the middle of the stem, is undeveloped, and only the sheath is present, but this is not the case with the second fertile head at the head of number two. I found a third in which this year's barren frond had shot up through the dead stem of last year's, carrying up a ring of the old stem with it, which had confined the tips of the branches of one whorl, so that they appeared to have been all turned down, and the ends tied round the stem. I do not know if these are curiosities, but they were new to me.—*C. L. Acland.*

**PHACELIA TENACETIFOLIA.**—This year I have grown for the first time the new bee-flower *P. tenacetifolia*. For the information of those readers of SCIENCE-GOSSIP who have not seen it, I may state that it is an annual, growing about eighteen inches high, with leaves almost resembling the frond of a fern, and bearing a pale blue flower, which is most delightfully scented; but the plant is chiefly remarkable for the eagerness with which bees visit the bloom for the purpose of extracting its hidden sweets; to-day I saw a bed of it literally alive with those industrious little insects; certainly it is worthy of being more extensively cultivated, both for its beauty and fragrance; moreover, it is very easily reared. Can any of the correspondents of SCIENCE-GOSSIP tell me something more about it? Where did it come from? Are there any varieties of it?—*D. D. Bennett, Cantab.*

**MOSQUITOES.**—What is the best preventive of stinging by gnats and mosquitoes; and what is the best remedy after being stung—ammonia, soda, lime juice, alcohol, vinegar, and Elder juice having failed?—*D. B.*



## NOTICES TO CORRESPONDENTS.

ALL communications relative to advertisements, post-office orders, and orders for the supply of this Journal, should be addressed to the PUBLISHER. All contributions, books, and pamphlets for the EDITOR should be sent to 192, Piccadilly, London, W. To avoid disappointment, contributions should not be received later than the 15th of each month. *No notice whatever can be taken of communications which do not contain the name and address of the writer*, not necessarily for publication, if desired to be withheld. We do not undertake to answer any queries not specially connected with Natural History, in accordance with our acceptance of that term; nor can we answer queries which might be solved by the correspondent by an appeal to any elementary book on the subject. We are always prepared to accept queries of a critical nature, and to publish the replies, provided *some* of our readers, besides the querist, are likely to be interested in them. We do not undertake to return rejected manuscripts unless sufficient stamps are enclosed to cover the return postage. Neither can we promise to refer to or return any manuscript after one month from the date of its receipt. All microscopical drawings intended for publication should have annexed thereto the powers employed, or the extent of enlargement, indicated in diameters (thus:  $\times 320$  diameters). Communications intended for publication should be written on one side of the paper only, and all scientific names, and names of places and individuals, should be as legible as possible. Wherever scientific names or technicalities are employed, it is hoped that the common names will accompany them. Lists or tables are inadmissible under any circumstances. Those of the popular names of British plants and animals are retained and registered for publication when sufficiently complete for that purpose, in whatever form may then be decided upon. ADDRESS, No. 192, PICCADILLY, LONDON, W.

N. K.—Drawings to illustrate papers must be executed sufficiently well to be copied on wood, but contributors are not required to draw them on wood. Failing this, the objects themselves should be forwarded, so that drawings may be made therefrom. The latter plan is preferable, unless the drawings are well done.

A. G.—We do not guess at the names of objects from crude description.

R. B.—Box received, but we can find no parasite.

W. D. D.—Both questions have been well ventilated in previous volumes of this journal, and we cannot repeat them. See SCIENCE-GOSSIP for 1869, pp. 20, 45, 68, 71.

W. W.—We have never examined them, and, therefore, are not competent to give an opinion. They are well spoken of at the price.

A. T.—We do not pretend to give advice on bee-keeping.

ALICE.—We have heard them called so, but never of their being poisonous or injurious.

W. A. G.—It is a gall caused by an insect—not at all uncommon.

W. L.—It is impossible to name, or to guess, from your vague description.

H. B. K.—We are not in the least surprised that your communications require “errata.”

J. F. D.—We can only guess that it may be so.

W. J.—Imperfect state (Conidia) of *Ascotricha chartarum*.

MOSQUITOES.—“D. B.” should consult SCIENCE-GOSSIP for 1868, pp. 207, 211, 212, 215, 236; and for 1869, pp. 17, 54. Undoubtedly a poison enters the wound made by the lancets of the female.

S. S.—You can obtain 100 specimens of microscopic leaf fungi, accurately named and arranged, at the office of this journal, for 12s. 6d.

W. B. L.—If you will send a specimen of your plant we will name it for you; we do not quite understand your description. The book you name is out of date; you should get some more modern manual—say Hooker’s “Student’s Flora.”—B.

J. E. TURNER.—Your moss is *Pleuridium subulatum*.—R. B.

H. J. B.—What “Medical Botany”? The White Dead Nettle (*Lamium album*) is employed in France.

## EXCHANGES.

NOTICE.—Only one “Exchange” can be inserted at a time by the same individual. The maximum length (except for correspondents not residing in Great Britain) is *three* lines. Only objects of Natural History permitted. Notices must be legibly written, *in full*, as intended to be inserted.

PLANTS.—Wanted, to exchange Northern for Southern or other plants.—William Todd, 2, Blundell Place, Leeds.

BRITISH SHELLS and MOSSES (including the new *Planorbis* and *Zonites* for foreign shells.—T. Rogers, No. 7, Cookson Street, Manchester.

*Physospermum cornubiense*, *Trifolium strictum*, *Neckera pumila*, *Hypnum flagellare*, &c., for other rare plants and mosses.—Send lists to R. V. T., Withiel, Bodmin, Cornwall.

BEST BEN LAWERS and Scotch Alpine Flowering Plants for Irish or rare English Flowering Plants.—Address, Rev. John Pagan, Bothwell Manse, Lanarkshire.

HAIR of Duck-billed Platypus, Tiger, Raccoon, and others, for objects of interest (mounted or unmounted).—E. Wilson, 82, Southampton Road, Hampstead, N.W.

MORPHO CYPRI.—Portions of Wing (neatly mounted) of this beautiful South American Butterfly offered in exchange for Injections.—W. T. Loy, 11, Garrick Chambers, Covent Garden.

LARVA of *C. plantaginis*, *A. fuliginosa*, and *B. Callunæ*, for other Lepidoptera. Answer by return if accepted.—A. Pickard, Wolsingham, Darlington.

SPORES of Lycopodium, Glands of Hop, Seeds of *Papaver Somniferum* (unmounted), for objects of interest (unmounted).—H. Durnford, Claremont House, Waterloo, Liverpool.

COLEOPTERA, Lepidoptera, and Ferns in exchange for others.—Address, Joseph A. Kershaw, Garden Road, Brighouse.

Eggs of the Grasshopper Warbler in exchange for Imagos of *Papilio Machaon*, or any of the Hawk-moths. Communications answered within a few days if still open for exchange.—John D. Walker, 13, Pilgrim Street, Newcastle-on-Tyne.

## BOOKS RECEIVED.

“The Transactions of the Malvern Naturalist’s Field Club.” Part III. 1870. Worcester.

“The Medical Investigator.” May, 1870. Chicago, 66, Lake Street.

“The Canadian Entomologist.” Vol. II. No 7. May, 1870.

“Land and Water.” Nos. 227, 228, 229, 230.

“Scientific Opinion.” Part XIX. June, 1870. London: Wyman & Sons.

“Monthly Microscopical Journal.” No. 18. June, 1870. London: R. Hardwicke.

“The American Entomologist and Botanist.” Vol. II. No. 7.

“The Gardeners’ Magazine.” June, 1870.

“Report of the Rugby School Natural History Society for the year 1869.” Rugby: W. Billington.

“The Dental Register.” Vol. XXIV. Nos. 4 and 5. April and May, 1870.

“Boston Journal of Chemistry.” May, 1870.

“Literary Leaves for General Readers.” June, 1870.

“The Journal of Applied Science.” June, 1870. London: Hailes & Co.

“The American Naturalist.” June, 1870.

“The Animal World.” No. 9. June, 1870.

“Transactions of the Woolhope Naturalists’ Field Club for 1869. Hereford, 1870.

“A System of Botanical Analysis applied to the Diagnosis of British Natural Orders.” By W. Handsel Griffiths, Ph.D. London: Wyman & Sons.

“On the Ammonia Compounds of Platinum.” By William Odling, M.B., F.R.S. Royal Institution.

“On the Descent of Glaciers.” By Rev. H. Moseley, M.A., F.R.S. Royal Institution.

COMMUNICATIONS RECEIVED.—A. H.—J. R. S. C.—R. H.—H. P.—C. P.—R. H. A.—R. S. H.—W. B. L.—T. R.—A. G.—J. E. T.—T. C. O.—N. K.—C. M. H.—H. E. W.—W. T.—R. B.—E. W.—W. D. D.—H. J. S.—W. P. N.—J. L.—F. B. W.—W. C. D.—B. G. C.—T. W. W.—J. P.—J. S. W. D.—C. L. A.—R. V. T.—C. J. W. R.—R. T., M.A.—A. P.—J. G. N.—J. D. W.—E. B.—G. B.—P. L. S.—J. W. W.—W. T. L.—H. B. K.—W. L.—W. A. C.—J. F. D.—A.—J. B.—H. J. B.—A. T.—J. B. H.—H. D.—R. H. N. B.—R. T., M.A.—W. D. H.—G. C. G.—J. A. K.—D. B.—D. D. B.—Q. F.—C. L. A.—W. P.—C. C. H.—S. A. S.—H. J. B.—A. C.





## THE STORY OF A PIECE OF GRANITE.

By J. E. TAYLOR, F.G.S., ETC.

**T**HERE are few rock substances on the surface of the globe which have received more discussion and been more investigated than myself. I am somewhat proud of the attention I have received in this respect, for most of the leading geologists of every country, for the last century, have devoted themselves to the task of seeking out my antecedents. I am acquainted with a whole library of books, all most learnedly written, and various of them proving the reverse of the other, which have been penned on this inexhaustible subject. Even yet the question can hardly be regarded as finally settled. Every now and then some moot point or another crops up to engage the attention of philosophers, but, thanks to the progress of other sciences, the investigation of these is no longer confined to verbal expressions. It is not a little amusing to remember the hot discussions which were held over me at the beginning of the present century. Philosophers though they professed to be, the disputants resembled political squabblers more than anything else. One set declared I was born amid fire,—the other that I was of purely watery origin. Each believed in their own *ipse dixit*, and, as nothing could be absolutely proved, backed their own opinions by personalities. Somehow or other the former sect, who were called Plutonists, got the better of the latter, who were termed Neptunists. (The origin of these phrases my readers will not find it difficult to understand.) But my Plutonic commentators carried their victory too far. Not content with proving that I was not

a mere aqueous rock, they proceeded to declare I was nothing more nor less than one which had cooled down from a fused condition, something like iron slag; nay, it was even urged that I was older than any other rock, and the theorists mapped out an idea—which existed for many years after, chiefly owing to its remarkable novelty—showing how the whole universe was formerly one great cosmical fog; that this diffused matter was condensed into suns, planets, and satellites, each of which existed for ages in a molten condition, owing to the heat evolved during the process of condensation; that the exterior of each planet cooled during the time which followed, and that granite formed part, or whole of this cooled envelope! Such in brief was the orthodox notion of my birth, little more than a quarter of a century ago.

Shall I enlighten my readers a little as to the nature of my mineralogical composition? I feel sure that most of them are acquainted with it already, but, if only for form's sake, I must go through with it again. My name is of Latin derivation, and was given me on account of the granular character presented by my different minerals. Generally speaking, these are four in number—Quartz, Felspar, Mica, and Hornblende. Very frequently there are also traces of other minerals; but these are the commonest, and those in fact which make up my bulk. The *Quartz* portion you may tell by its glassy appearance, and usually milk-white colour; whilst another good test is its superior hardness. This mineral is almost pure silica, and is one of the most refrangible of known substances. It can with difficulty be slightly dissolved in hot water, under great pressure; whilst it requires a great deal of heat to melt it, and, generally speaking, some sort of *flux* to set it a-going. Next most abundant mineral in the constitution of myself and relatives (for our name is Legion) is that called *Felspar*. Your eye may detect it in any mass, by its pink or flesh-colour, whilst it is so soft that you may scratch it with your finger nail. It is owing to the unusual



abundance of this mineral that I am sometimes so friable or "rotten," as the felspar decomposes, and then causes the other minerals to fall asunder, just as the bricks of a wall would if all the cementing mortar were to decompose away. In many districts, as in Cornwall, where granite comes to the surface and has been subjected to atmospheric wear-and-tear for hundreds of ages, it is not uncommon to find the fine felspar washed into a newer deposit. Such is the well-known "kaolin," or China clay of commerce. The chemical composition of felspar is more complex than that of quartz. For instance, although its commonest elements are silica and alumina,—the former the base of common sand, and the latter of clay,—there are also contained in it more or less of soda and potash, lime, magnesia, and iron. *Mica*, the next commonest mineral I possess, is so well known as hardly to need description. All my readers are surely familiar with the small, thin, silvery-looking scales contained in almost every piece of granite. Its ingredients are much like those of felspar, only differently mixed. Frequently *Hornblende* is a mineral entering into our composition, and my listeners will readily remember it from its black or dark olive-green colour. When it is very abundant, it produces a rock varying from dark grey to black. A great number of what may be termed varieties of hornblende are known to mineralogists. Its chemical composition, generally speaking, is about one-half silica, more than a quarter magnesia, and little more than half a quarter lime: besides these, there are usually traces of iron, alumina, and fluorine acid.

I mentioned above that I had many relatives, who were more or less nearly connected (I cannot say by blood, but by mineralogical similarity of composition). These take various names, on account of their leading peculiarities. Among these the commonest is *Porphyry*, which takes its name from the purple variety used by the ancients in making vases, &c. This my hearer may know from the large and distinct crystals, usually of felspar or quartz, which are imbedded in the granular matrix. Through porphyry granite passes into all sorts of allied igneous rocks, such as *Claystone Porphyry*, *Clinkstone Porphyry*, *Felspar Porphyry*, and so on. When hornblende takes the place of mica in the composition of granite, the latter goes by the name of *Syenite*; when *talc* supplants mica, the result is called *Protogine*. A fine-grained compound of felspar and granite, with equally minute scales of mica, gives to us the varietal name of *Pegmatite*. According to the number of minerals entering into our composition, I and my relatives are roughly classed as *Binary*, *Ternary*, and *Quaternary* granites. All this detail of structure may sound very dry and tedious; but it is absolutely necessary to go through with it, if my listeners wish to be more intimate with me.

Although I have not a distinct recollection of my

birth (as indeed, who has?), yet I have more than a suspicion that such elements as soda, potash, lime, &c., greatly assisted as fluxes in bringing me into my original molten condition. I have mentioned the great number of relatives which claim near or distant kinship with me, and I have now only to remark that their affinity to myself has been determined solely by the different circumstances attending their origin. I distinctly and utterly refute the idea that the first-formed crust of the globe was a granitic one! I am fully persuaded it could not possibly have been granite, and I will give you my reasons by-and-by for this seemingly bold assertion. What that cooled crust was, I doubt if science will ever be able to discover. But the fact that it was not granite does not in the least invalidate the theory that every sun, planet, and satellite was so condensed from nebulous matter. This theory must rest on other grounds, and, singularly enough, additional facts are coming to its support every day. We have not the slightest idea of what the *primitive* rock or crust of the globe was. The antiquated notion that it must have been granitic arose out of mistaken associations. It was found that, however old might be a stratified rock, whether containing fossils or not, some variety or another of granite was older still. Hence followed the hasty deduction, that originally one granitic crust encircled the fluid matter of the interior of the earth. It was shown how subsequent rocks were themselves formed out of the wear-and-tear of this granite, how the latter was in many places covered up by its own debris, and how the so-called metamorphic rocks were those first formed as stratified deposits, but altered to their present appearance through the intense heat of the newly-created seas, along whose bottoms they had been elaborated!

All this is wrong, and it behoves me now to descend from the region of pure hypothesis to that of pure fact. It is just possible, speaking generally of all the varieties of my family, that *Protogine* may be oldest. This, however, has never been thoroughly determined. One of my reasons for believing I could not have required any very great heat to reduce me to the molten condition, and that in this process the agency of water, as well as of heat, was necessary, is as follows:—Many of the larger quartz crystals entering into my composition are hollow. Frequently these hollows are more or less filled with water. Now, it is a known fact that molten matter at a white heat requires its temperature to be considerably lowered before it can even evaporate the water mechanically mixed with it. It has been recently shown that crystallized matter which has undergone pure igneous fusion, has usually cavities in its crystals, not containing water, but either stony matter or a kind of glass, and, in many cases, even a perfect vacuum. Hence the conclusion is arrived at that in the case



of coarse-grained granite, containing much quartz, there is actually more proof of the action of water than of dry, igneous fusion. It is more than probable, therefore, that pressure, heat, and water combined, in the deeply-seated parts of the earth's crust, would cause the rocks to be reduced to a kind of paste, and that this paste would be some variety of granite. I can hardly enter into the abstruse details of the deductions which have been made from the chemical and microscopical examinations of myself and relatives. Suffice it to say they result in proving that *pressure*, and this, generally speaking, of overlying rocks stratified or otherwise, is a preliminary and indispensable necessity to the formation of granite; that, if pressure be absent or less than that required, notwithstanding all the other requirements may be present—such as heat, similarity of mineral ingredients, &c.—such a resulting igneous rock would *not* be granite! It might be a variety of porphyry, or basalt, or greenstone, or, if all pressure were removed, and the molten matter allowed to cool in the open air, simply ordinary *Lava*! From a microscopical examination of various granites, it has been shown that those of the Highlands of Scotland indicate their having been formed under no less a pressure than 26,000 feet of overlying rocks more than were the granites of Cornwall. There is good reason for believing the latter to have required at least 40,000 feet of rock-pressure; so, in that case, the granites of the Highlands must have been formed when 66,000 feet of overlying rocks were piled above them!

One is naturally astounded by the magnitude of these operations, but I assure my hearers there is little doubt as to the general correctness of the deductions. In this way the mineralogical construction of myself and others supplements the teaching of organic remains as to the immense antiquity of the globe! Nothing short of an eternity of time would have sufficed for all the changes which have been rung upon it. There is reason to believe many of my granitic relations are nothing more or less than *re-melted* stratified rocks, and their enclosed fossils! As these have been slowly depressed or submerged, so as to bring the lowest-seated portions within the influence of the earth's internal heat, they have been first metamorphosed into a similar condition to gneiss and mica-schist, and, if the sinking went on, have passed through this stage into that pasty condition which deprived them of all stratified structure, and converted them into what I am myself! Then succeeded a reversal of the movement; so that this granite would be thrust slowly upwards with all the overlying strata piled above it. The movement went on until these were tilted into a continuous mountain-chain, or high and extensive table-lands. Meantime the granite nucleus would form the heart

of such mountains, the strata dipping away, as in the Himalayas.

I fancy I hear some of my listeners remarking—"But if granite can only be formed under such immense pressure, how is it we find such large areas of country where nothing else is to be seen?" In the answer to this we have the gist of the argument, and I would respectfully ask the special attention of my audience to it. Let them ask themselves where the materials came from to form the Laurentian, Cambrian, Silurian, Devonian, and, in short, all the other subsequent formations? They could only have been formed out of the waste of still older and already solidified rocks. Each formation, therefore, represents the amount of wear-and-tear which went on during the period when it was deposited. If there had been no compensation against this levelling process, all the prominences would soon have been worn down to a common level, and the elaboration of more recent deposits been self-checked. But each succeeding formation shows that this was not the case, but indicates that the physical arrangements of our planet have been much the same through all time to what they are at present; that atmospheric and marine wear-and-tear were counter-balanced by upheaval from beneath; that the exterior force emanating from the sun and resulting in all these atmospherical effects, was exactly adjusted by the native force of the earth, exerted from the interior outwards. These two have been in equable counterpoise from the beginning, otherwise the great life-scheme of our globe would never have had time for its development!

I hope I have been successful in explaining a great difficulty, and that my listeners now see the reason why I and my relatives come to the surface. It is because the rocks which overlay me at my birth have since been stripped off and slowly removed by atmospheric agencies. All the formations which were then piled above me, are to be found in stratified rocks of later date; therefore, the period of my birth is not limited to any particular geological epoch. I am found at the surface, surrounded by rocks of every age, even including those of the Tertiary. Wherever the pent-up force of the earth's interior has thrust us up, there have we slowly elevated the rocks lying upon us. In many cases this elevation has been so slow that it has hardly exceeded the rapidity with which these overlying rocks have been denuded away! Think of the vast antiquity of our earth's crust, as indicated by these facts alone! Since the granites of the Highlands of Scotland were formed, twelve miles of overlying material must have been removed! Where has it all gone to? Ask the nineteen miles in vertical thickness of the known stratified rocks, all of which have probably been formed since the granite itself. We scarcely need be afraid of Time, when we have Eternity to draw upon!



## COMMON BRITISH SPONGES.

OF all objects from the seashore there are none which appear to be so little studied, or so imperfectly known as sponges. A few isolated individuals have devoted themselves to the subject, and with them the study begins and ends. It is quite true that the cabinets of most microscopists contain two or three slides, labelled with mysterious vagueness "Spicules of Sponge," but surely their possessors would not claim the possession of any knowledge of sponges, or they would never tolerate such "encumbrances." Pressed closely on the point, and in nearly every case, the common commercial sponge is the only sponge they are conscious of having seen. Here and there a vague doubt may exist, whether the beautiful Venus's flower-basket (*Euplectella*) is not a sponge, but it is not every one who has arrived at this happy consummation of doubt. If one ventures to suggest "sponges" as microscopic objects to be sought and brought from the sea, it is at the hazard of an answer which once greeted us,—“Oh, I can buy sponge at the oil-shop.” Alas! poor man, his knowledge of sponges was not burdensome. Beyond this there is, however, a little advance amongst the majority of microscopical students; and to assist such in their annual 'trip to the shore,' we have resolved upon offering a few suggestions. In the first place, we have no English book which can be recommended to students of these organisms. There is "Dr. Bowerbank's Monograph of the British Spongiadæ," published by the Ray Society, and this has at least three faults, as a student's manual. It is too large to be handy; it is too expensive for the ordinary microscopist, who requires manuals on other subjects as well; and it is by no means lucid in its descriptions. In fact, it is more suited to the wants of the professed man of science than the humble student, and perhaps it is far from perfect even for this. Sponges are not things which can be identified off-hand. It is absolutely essential that they should be examined carefully under the microscope before pronouncing upon them. In order to accomplish this, something, at least, must be known of their structure, and the modifications which their external form assumes. Finally, the examples of sponges picked from the beach are dead, bleached, and almost caricatures of the fresh and living creatures brought up by the dredge; however, such as they are we purpose confining our observations to such examples as may be found in moderate preservation "cast up by the tide"!

To begin with one of the commonest, we will take that which is known by the name of *Chalina oculata*, of which we give a figure (fig. 159). It is branching or tree-like in its shape, often on the coasts of North America more than a foot or sixteen inches in length, but with us usually considerably less. It is

variously branched, occasionally palmate or digitate, with the branches rounded or compressed, and the surface even. Orifices called *oscula* are arranged somewhat in lines, and more or less on one side of the branch. The margins of these orifices are slightly



Fig. 159. *Chalina oculata*, nat. size.

elevated. The outer membrane contains a few slender needle-like spicules. The spicules of the interior or skeleton are shorter and stouter, and rather spindle-shaped. When alive, this sponge is yellow, with a tint of green, but when cast up upon the sand, it is of the colour of whity-brown paper, or rather darker than the sand. The accompanying figure (fig. 160) will give a tolerable notion of the appearance of a portion of a section of this sponge under the microscope, with the spicules mixed up



with and strengthening the keratose skeleton: an enlarged figure of the spicules is also given (fig. 161). After stormy weather it is not uncommon to find

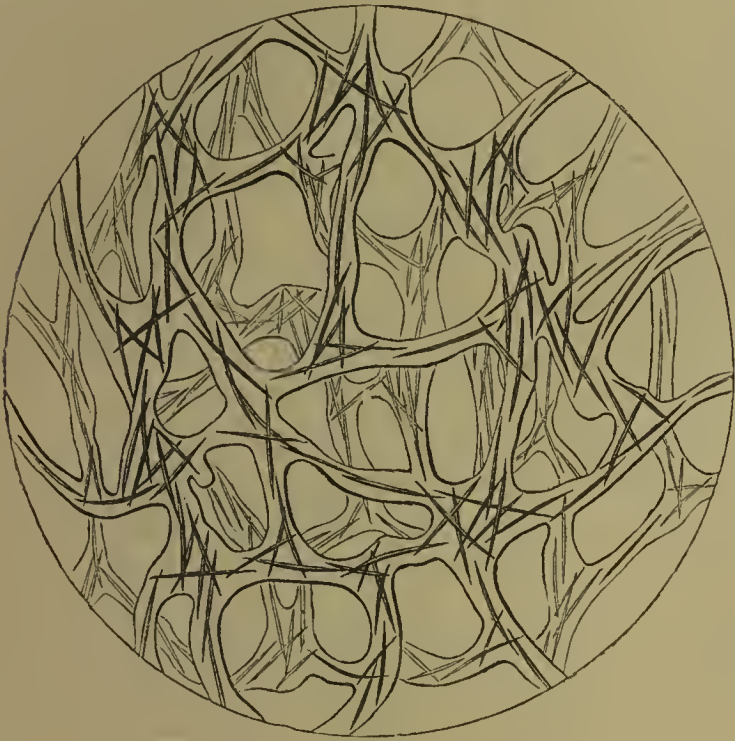


Fig. 160. Section of *Chalina oculata*.

numerous specimens at almost any point on our coast, but generally much beaten about, bleached, and denuded of the external membrane.



Fig. 161. Spicules of *Chalina oculata*.

Another sponge less common, smaller, firmer, and more compact in its habit, is that next figured (fig. 162), called *Halichondria ramosa*. It is by no means our intention to enter here upon the description of the characters of the genera, or why one should be a *Chalina* and the other a *Halichondria*, which would extend this chapter beyond reasonable limits. We would only observe that in *Chalina* there is a fibrous skeleton of keratose, and that in *Halichondria* the spicules are cemented together into a network. The specimen figured is called *Dictyocylindrus ramosus* by Dr. Bowerbank. When alive, this sponge is yellow, orange, flesh-colour, pink, or crimson; acquiring a brownish colour in

the dry state. The height seldom exceeds three inches, and there is very considerable variation in the ramification. The branches are frequently much



Fig. 162. *Halichondria ramosa*.

compressed. Near Torquay specimens have been dredged as much as ten inches high. This sponge when dried presents a very marked difference from the *Chalina*, in that the spicules project all over the surface, so as to give the sponge a hairy-like appearance. The spicules are of a similar character, but differ in size from those of the *Chalina*, and there are none in the membrane. In neither case are the spicules attractive as microscopic objects.



Fig. 163. *Halichondria panicea*.

The last sponge to which we purpose alluding is quite as common as the first, and more so than the last. It has been called the "crumb-of-bread" sponge (*Halichondria panicea*), from its resemblance when dry to a piece of the crumb of white bread. When alive it ranges from light ash to yellow, orange, or green. The shape varies exceedingly, sometimes enveloping the stems of the



larger sea-weeds or zoophytes, or running over stones or rocks (fig. 163). When living, it is quite smooth, but when dry the surface is minutely reticulated. Internally, when broken, the sponge-masses are, for some time after being dead, of a yellowish green. The membrane is abundantly

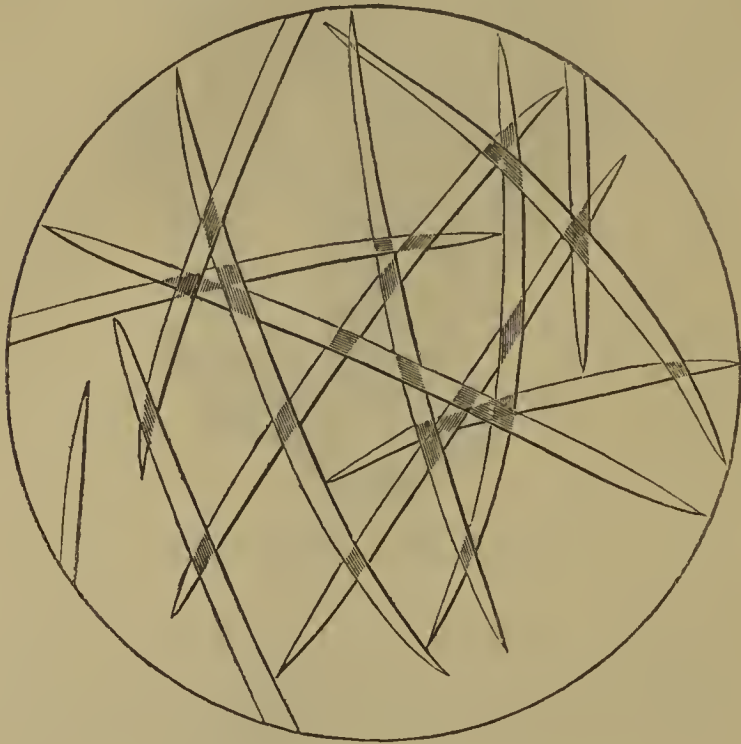


Fig. 164. Spicules of *Halichondria panicea*.

spiculous, and the entire skeleton, as in other species of the order, is made up of spicules cemented together. They are rather long and spindle-shaped, somewhat curved, and pointed at either end (fig. 164). It is recommended that sections of all these sponges, from the surface inwards, be mounted, instead of the cleaned spicules; by which means more of the structure may be learnt.

#### MOTH "SEMBLING."

THE very capital paper by Mr. Wonfor, which has recently appeared in SCIENCE GOSSIP, brings to my recollection sundry experiments of my own in the same direction. I would note, first of all, that the name given by the old collectors to this peculiar method of attracting moths was doubtless abbreviated from the word "assemble." And, in some instances, the male individuals of a species will assemble, under this fascinating power, in goodly numbers, if the weather be favourable (for this is an element in the matter which must not be lost sight of), and the female moth, serving as the bait, be recently emerged from the chrysalis. Though Mr. Wonfor adduces some instances wherein the attractive influence was shown after a day or two, I believe these are exceptional cases, and it is only now and then that a female will draw a retinue of male admirers under such circumstances. I have not the slightest doubt myself that the agency by which this is done is some peculiar scent or aroma diffused through the air,

and which, though almost infinitely rarefied, is detected, and, not only detected, but used as a means of guidance by the male moths. I have perceived an odour given off from some species of ARCTIA, and also by *O. gonostigma* (Scarce Vapourer), slight indeed, but sufficiently noticeable by the average human organ of smell, and, no doubt, better recognized by the finer organs of a moth, and apparently at a considerable distance off. There are those, it should be stated, who believe that this attraction is induced, not by the faculty of smell, but by some peculiar sense unknown to us at present. This, however, is mere theory, while the other view appears to rest upon actual fact.

Failure in some cases where females have been taken out to "semble" males, has been caused by the circumstance hinted at by Mr. Wonfor, namely, that the hour was one not usually chosen by the species as its time of flight. Some constantly adhere to a particular time, and will not stir under any persuasive agency which may be employed by the female individuals thus experimented with. And there are also certain species even amongst the BOMBYCINA group of moths, where the males are too shy to approach while any observer of the human race is in near proximity. In such cases it has been recommended, when you have a virgin female moth to dispose of, to secure her to a branch or twig by a silken thread, when, if you fail to catch male moths, you will at least get the female impregnated, and have a hatch of eggs from which you may breed males. I have recently tried this with the Pale Tussock and the Coxcomb Prominent, but did not succeed in either case in getting eggs from them; the cause being, I think, that through the pupæ having been kept in confinement they emerged rather too soon, and anticipated the flight of the species at large. It is not a very easy matter, however, to pass a band first round the body of a living moth, and then secure it in a suitable position to some twig. I suggest, as an improvement, which I shall certainly try in future experiments of the kind, that it would be well to submit the moth first to a process of *anæsthesia*, just producing that slight insensibility which will pass off, in most species, in the course of an hour, or even less, leaving the individual none the worse.

I do not think that much success in this direction can be anticipated amongst the Hawk-moth tribe. Rennie mentions an experiment of the kind which he tried with the Lime Hawk, when he exposed a female for some days in a locality which he knew to yield the species. Yet some of the Hawk-moths will pair in confinement, as for instance the Poplar and the Eyed Hawk. But I believe that these species, which, as we know, are in the habit of resorting to flowers, take some food usually ere they pair; also the females of some I have captured on the wing have subsequently laid eggs which prove



barren; showing that, unlike moths of other families, they do not remain quiescent until impregnated. It might be supposed that the apterous females of certain species would show a most indubitable attractive power; and this appears to be the case amongst those GEOMETRÆ known familiarly as the Winter Moths. The males in these are often found sitting by day on palings or twigs, in near proximity to the females, or flying in slow circles round the same spots at even-tide. So also is it with the stout-bodied moths belonging to the rather abnormal family amongst the GEOMETRINA, known as the *Amphydasidæ*. One species in particular, well known to the entomologists who occasionally explore our London parks,—viz., the Brindled Beauty (*B. hirtaria*), may be cited as an instance. When I have had females of this species emerge in a breeding-cage placed in an outhouse, the males have clustered on the window, or hovered about the door intent upon getting in. The males of two Vapourers—the one so common and the other so local—are, by the means we have indicated, brought to the female wingless individuals; and I have several times obtained eggs of the Scarce Vapourer (*Orgyia gonostigma*) by placing a female in the only locality I know where the species occur near London. Of the last attempt of this sort the result was untoward. Some females having emerged from their cocoons spun up in a preserve-pot, I hid them in a convenient bush, and withdrew. Some malicious bypasser, however, detected through the leaves the white earthenware, and smashed it in pieces, destroying moths and my future hopes. Well, such mishaps must be sometimes.

J. R. S. CLIFFORD.

#### COWPER AND THE NIGHTINGALE.

AS a warm admirer of this poet, and a diligent student of his prose and poetry, I regard it almost equivalent to “treason-felony” to find serious fault with him. With regard to the Nightingale’s song in mid-winter, I have felt a suspicion that possibly the bard fell into an error. We find he does not say that he saw as well as heard this bird, which thus welcomed the new year, and yet, at a season when the trees are bare, one would have imagined that he would have endeavoured to verify the fact by ocular demonstration. There have been birds which have mimicked the nightingale’s song; the blackbird has been stated to do so sometimes, and there would be nothing extraordinary in his song being heard on the 1st of January, though not a usual thing. Cowper alludes to this memorable nightingale in a letter written to his kinsman Johnson (Norfolk Johnny), he having boasted that he had plucked primroses on Candlemas Day; and Cowper thought his nightingale’s song a more remarkable thing, and adds that were it an omen for

him it must surely be a good one. After all, the incident must remain doubtful. J. R. S. C.

#### LOCUSTS AT SEA.

THE Indian Ocean was like a mill-pond; not a ripple was observable but what was caused by the ship herself, and the word “sea legs” was never once used without a blush all the way across. Neither was there any sail nor any signal observable—a matter of deep regret to all, especially to those who had invested in powerful binoculars before leaving Bombay, in order specially to note the sights of the voyage. For once, indeed, locusts were a god-send, and the movements of a little sparrow, which found not where to rest its foot, except on the deck of the *Behar*, were so closely watched that the poor creature found no place of repose from stem to stern, except in a dark nook of the Captain’s cabin, where its privacy could not be rudely invaded, nor its hunt after flies and “all such” interrupted by the proximity of the idle and the curious. Whence the birdie came, we did not much trouble ourselves; but we wondered much about the locusts. Before leaving Bombay, we were under the comfortable impression that these creatures dared not, under pain of death from natural causes, approach to within a certain distance of the sea—the theory being that sea air played the mischief with their lungs, whereupon they sickened and died. But if this rule holds good in the main, there certainly are some hardy exceptions; for, in the middle of the Indian Ocean, hundreds of miles from land, there were our friends the locusts, not in millions, as we left them in Guzerat, but certainly in dozens oft repeated. How they came there was very evident—they must have flown; but how they managed to fly so far without suffering from *mal de mer*, the pangs of hunger, or some other ill—that was the question on which no one found himself qualified to express any decided opinion. And they did not seem to be suffering from anything in particular. They were precisely the same species of locust that was sent down “on view” to Bombay in soda-water bottles from Guzerat, and they were as lively as possible. Therefore it was that they were a god-send, as I have said; for, numerous as they were, any individual member took a great deal of catching. This catching of the larger ones for the doctor and other enthusiastic naturalists to pickle, was a most interesting occupation for three or four days; and probably the mention thereof will be of interest to naturalists elsewhere. Seeing that these locusts continued to cover the awnings and crowd the rigging for days—fresh supplies every morning—they must have been spread over a great expanse of sea, 600 miles at the very least.—From letter written on board the “*Behar*,” *Times of India*, Nov. 24, 1869.



## HASAN-I-YUSAF.

ONE of the obscure substances occasionally and locally employed in India for medicinal purposes by the natives is known by the name of "Hasan-i-Yusaf." This is seldom mentioned, and does not appear to be generally known in India itself. Lahore, and probably Kashmir, seem to be almost the only places where it has any reputation; and for what diseases it is supposed to be a remedy, we have no information. After some ineffectual attempts, we at length succeeded, through the kindness of Dr. J. L. Stewart, in obtaining a sample of this drug by post from Mr. B. Powell, of Lahore.

The description of this substance given by Honigberger in his "Thirty-five Years in the East" is very brief. "Hossen Jussif," he writes, "is officinal in Lahore. It is a whitish seed of the smallest size, very likely to be mistaken for unripe poppy-seeds." In reference to this, there is a note in the "Handbook of the Economic Products of the Punjab" (p. 384), to the effect that the "Hasan-i-Yusaf is a minute, siliceous shell of a triangular form, found floating on lakes and ponds in the hills of Cashmir, whence it is skimmed off and dried. Erroneously described by Honigberger and others as a seed." A little more explicit information on the same subject is given in another portion of that work (p. 320). Repeating the name as "Hussan Yusuf," it states:—"This is a very interesting specimen of the siliceous frustule of one of the *Diatomaceæ*. It is of a pyramidal form, with

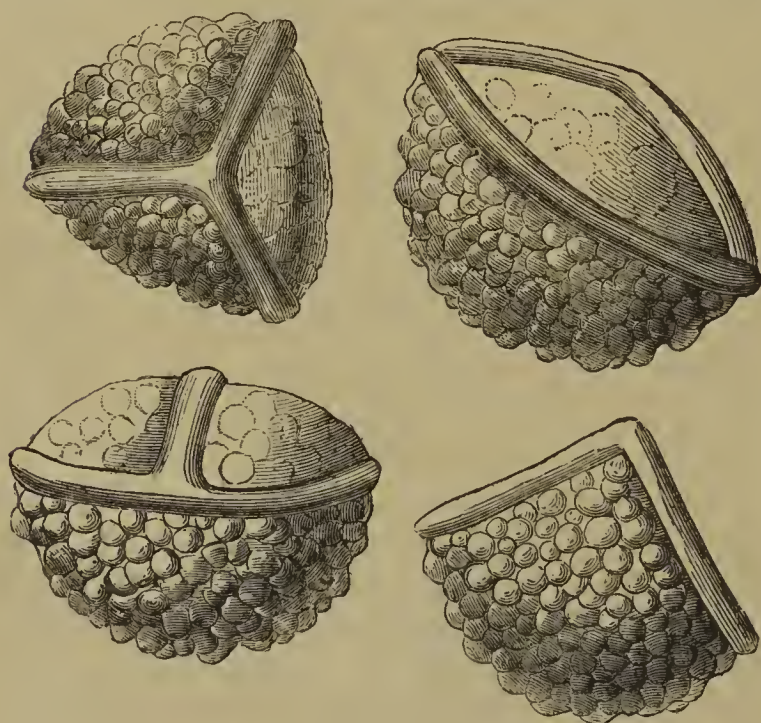


Fig. 165. "Hasan-i-Yusaf" from Kashmir.

a convex base, and on each triangular face is a prominent rounded knot. These markings are not affected by acids, and remain after heating to redness. When heated in a reduction-tube, it gives off a peculiar smell and combustible gas, showing that it is quite in a fresh state; otherwise it appears somewhat similar to a fossil. 'Hussan Yusuf' is

collected in lakes and ponds in the hills around Srinagar, in Kashmir. It floats on the surface, and is skimmed off and dried" (fig. 165).

A momentary glance is quite sufficient to convince any one practically acquainted with the *Diatomaceæ* that this white granular powder is not composed of diatoms, and has no affinity with the *Diatomaceæ* whatever. It was suggested that it might be foraminiferous, to which there is a greater resemblance. Fortunately we sent a little to Dr. Henry Carter, F.R.S., who was well acquainted with microscopic objects in India, and foraminifera in particular. This gentleman at once suggested its affinity with the spores of *Selaginella*, and furnished for comparison those of *Selaginella cernua*, referring at the same time to the figure at page 436 of the "Micrographical Dictionary." The spores of *Selaginella* are almost identical in size, but more globose, less definitely ribbed, and, although allied, are not alike. Keeping in view the place at which this substance is said to be collected, "from the surface of lakes," it occurred to us at once that some species of *Isoëtes* would be the probable source. There being a family relationship between *Selaginella* and *Isoëtes*, it seemed probable that the spores of *Isoëtes* would resemble those of *Selaginella* and the "Hasan-i-Yusaf." A reference to the figures of the fruit of *Isoëtes capsularis*, in Griffith's "Icones Plantarum Asiaticarum," part 2, plates 116 to 118, has confirmed the opinion that the curious substance, instead of being a diatom, consists of the macrospores of a species of *Isoëtes*, allied to, even if not identical with, the *Isoëtes capsularis* of Roxburgh, or the common European species. Especially should figure 4 of the 116th plate be compared with the "Hasan-i-Yusaf" (fig. 166). It is, moreover, perfectly true that this substance does not appear to be at all influenced by contact with cold nitric acid; and even when subjected to boiling in acid, very slow and gradual, as well as imperfect, disintegration takes place, unless the spores are first broken up. This fact, however, is by no means fatal to the conclusion that they are *Isoëtes* spores, in which, if we

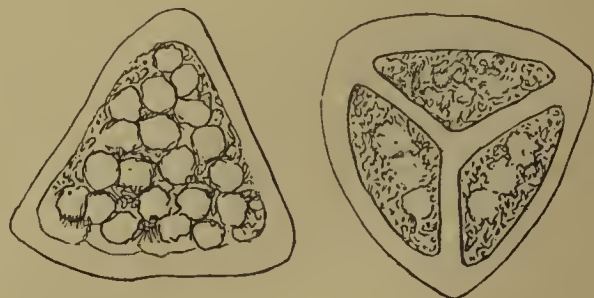


Fig. 166. Spores of *Isoëtes capsularis* from Griffith's "Icones Plantarum." Facsimile from Plate 116.

mistake not, a similar result will accrue, at least if we may judge from the treatment of *Selaginella* spores with cold acid.

Perhaps the strongest evidence of all is that furnished by the "Flore d'Algerie," the 36th and



37th plates of which contain excellent figures of *Isoëtes* spores. Those represented on plate 37 as the spores of *Isoëtes velata*, are almost identical with the "Hasan-i-Yusaf," and leave not the slightest reason for doubt as to the source of the latter. This will be seen by comparison of our rough transcript of the spores of *Isoëtes velata*, from the "Flore d'Algerie," with the other figures above.

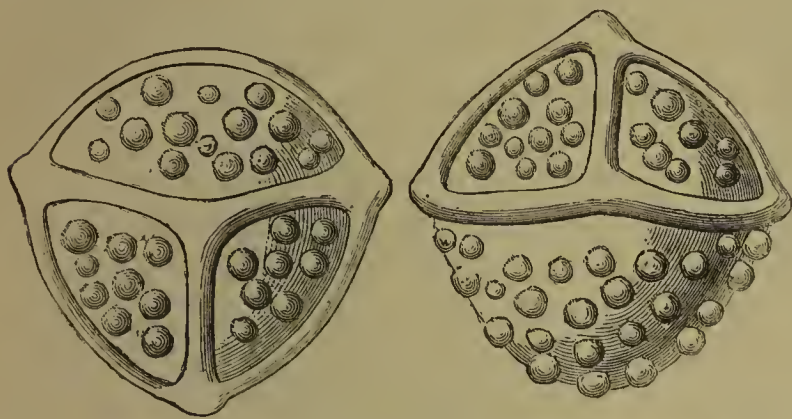


Fig. 167. Spores of *Isoëtes velata*.

It only remains to ascertain what species of *Isoëtes* is found on the lakes of Kashmir, and to compare the spores with this substance. The form, texture, porcellanic appearance, resistance to acid, place, and mode of collection, affinity to *Selaginella*, and agreement with Griffith's figures, all indicate one source, which we have indicated, for the "Hasan-i-Yusaf;" and we commend this explanation with some confidence, as removing the chief difficulties in the way of identification of this mysterious substance with its botanical source.

#### SEPIOSTAIRE.

THERE may be seen on many of our coasts, after a storm, amongst divers waifs and strays, a small boat-shaped piece of exceedingly chalk-like substance, commonly known as cuttle-bone, though it has really little, if any, title to be styled bone. This "bone" is in the animal inclosed in a little sac within the body, and it is very readily disengaged therefrom, if our friends chance to discover a defunct cuttle. The powdered bone is, we believe, commonly to be met with in perfumers' shops, under a multiplicity of names, being sold as tooth-powder, &c. &c., to a considerable extent; and school-boys are usually aware of its ink-extracting qualities; which said powers of erasement appear to have somewhat puzzled some young students of science at one of our educational establishments lately, if their published memoirs be credited.† And, in truth, it is to these very ink-erasing properties that I owe my acquaintance with the cuttle-bone. A piece was sent me by a microscopical friend with these notes, "Can you make anything of this cuttle-bone?—our boys use it (on the sly, I believe, but I won't 'split') to rub out their ink-blots." On its receipt

I set to work to sectionize it very extensively, and it has occurred to me that some of the readers of SCIENCE-GOSSIP may be interested in a brief *résumé* of my work, and a few sketches from my slides.

The Rev. J. G. Wood thus writes of the bone:—"If it be cut across and examined through a lens, the cause of the lightness will be perceived. The plate is not solid, but is formed of a succession of excessively thin laminae, or floors of chalk, each connected with each by myriads of the tiniest imaginable chalky pillars." This is a popular description, but does not possess the merit of being faithful to facts. Examined under a sufficient power, the cuttle-bone certainly has *not* a chalky appearance, the calcareous plates or floors, even, assume a transparency which would certainly not call up the idea of a section of chalk, and the laminae, or "pillars," which support the floors are really sinuous plates of remarkable tenuity and wonderful delicacy. A very cursory view, however, might lead one to regard these laminae as pillars—not round, but conical, and arranged in a most arbitrary manner; and the full truthfulness of Dr. Carpenter's description ("Microscope and its Revelations") is not seen until many very careful sections have been made.



Fig. 168. Sepiostaire, vertical section.

We give (fig. 168) a view of a vertical section across axis, viewed as an opaque object. It will be seen that there are evidences of a certain sinuosity in the arrangement of the "pillars," which would awake suspicion as to their true character. We notice that each lamina is attached to the surface of the floor by a thickened adhesion, and that it may easily be separated therefrom.

Fig. 169 gives a view of what one of my friends has called a ground-plan of sepiostaire. It is simply a "block" of "pillars," with the upper floor removed very carefully, to enable us to see the true arrangement of the laminae. A section of the kind, with an oblique slice taken off it, shows the sinuosity well.

As transparent objects, sections of sepiostaire are exceedingly beautiful when used with the polariscope. The section should be very thin, carefully



mounted, and, to my notion, is better without the use of a sclenite. Everything depends upon the "setting" of the analyzer prism, which must bear

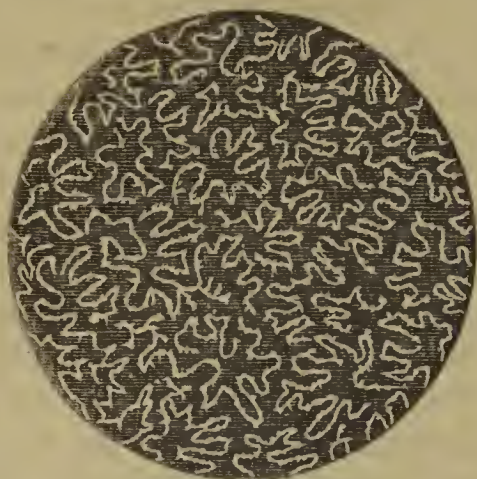


Fig. 169. Sepiostaire, Ground Plan.

a certain relation to the arrangement of the sepiostaire. This found by experiment, the polarizer may be rotated, and a wonderful play of colour will be the result.



Fig. 170.  
Sepiostaire, canaliculi  
of basal membrane.

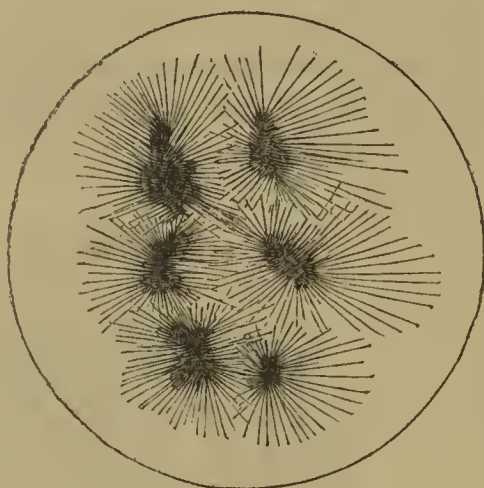


Fig. 171. Sepiostaire, Horny  
Case of, x 100.

A little diluted acid will decalcify the lamina, but leaves only a little almost structureless membrane, having nothing particular noticeable about it, though certain evidence of striation in the vertical laminae would lead one to expect variations of structure in the membrane itself, especially as the "pillars" are but partially calcified.

The horny outer layer, or "shell," differs from the "bone" proper, and is likened by Dr. Carpenter to the "hinge-tooth of Mya," from which, however, it has points of difference, which our cut (fig. 171) attempts to bring out as strongly as possible.

H. POCKLINGTON.

**ZEUZERA ÆSCULI** (Wood-Leopard).—This moth abounds in some gardens here, and has completely destroyed several fine ash-trees. I found the moths, male and female, on the trunks of the trees, in the afternoon, just out of the chrysalis; they are very sluggish, and come off on the edge of the net when touched with it.—*H. C. Leslie, Erith.*

## DIATOM MARKINGS.

ALL microscopic students must feel grateful to the Rev. J. B. Reade for his demonstration of the true markings of Diatoms, and his description of the method of observing them by means of the prism and parallel unilateral light, as given in his very interesting paper in the *Popular Science Review* for April last. The rotating stage confirms his discovery, and makes us sure that our microscopes no longer mislead us. It is humiliating, that so many old observers (ourselves among the number) should have been so long "led by the nose," to see dutifully just what they were told. They must have seen the hemispherical markings, and they were even photographed by Dr. Maddox, as shown in the beautiful frontispiece to Dr. Beales' "How to work with the Microscope," but they were not recognized as true. Now that we know what to look for, and how to look for it, other methods may be used; and we may venture to point out the use of Wenham's Parabolic Illuminator for this purpose. Stop out the half furthest from the light, and with the concave mirror a little diverted towards the source of light (a clear sky is the best), throw a spot of light full upon the open part. The illuminator must be withdrawn from a quarter to half an inch below the stage, according to the power used. A strong ray of light will then fall obliquely on the object, and will be rendered virtually parallel by the convexity of the illuminator. With a one-eighth power and third eyepiece, giving, with the draw-tube, a diameter of 2,000 linear, the hemispherical markings of *Pleurosigma angulatum* are in this way beautifully shown. *Navicula gracilis* (the Amician test) is resolved into rows of hemispherical dots set very close together; and the lines of *Grammatophora subtilissima*, of which we were once glad to obtain a glimpse, are similarly resolved. *Pleurosigma rhomboides*, under a very favourable light, can be scarcely "glimpsed." It demands a much higher power to see that exquisite diatom clearly.

We have not yet invested in a one-sixteenth immersion lens, preferring to wait for further light on "aberrations" and "clearers." It may be worth mentioning that the *Naviculæ, gracilis* and *rhomboides*, are both abundant in the Lapland Bergmehl, which is to be found in most cabinets. The Wenham Illuminator may be kept one-half stopped off even when used for other objects. It will, by unilateral light, bring out some structures not otherwise easily seen. In working with the higher powers by very oblique light, a liberal use must be made of the adjustment-screw.

S. S.



## MARINE AQUARIA.

THE recent article on the "Marine Aquarium" by my friend Mr. C. Meltzer has, I hope, stimulated the desire of many of your readers to possess the means of carrying on the study of Marine Zoology at home, and as the present season of sea-side holidays would afford convenient opportunities of establishing an aquarium, a few remarks on some improvements which I have added to my own may, perhaps, be acceptable.

I had been in the habit of drawing off the water to a certain extent daily, but in time it became apparent, as my interest began to flag (as it sometimes will), that this was a somewhat fatiguing process, and therefore one that was likely to be forgotten for a day: thus greatly deteriorating the condition of the water. In order, therefore, to make the tidal arrangement as self-acting as possible, I added the following:—

At the level of high-water mark I made a hole in the slate back of my tank, through this I inserted a glass tube (which may be made to fit completely water-tight by placing over it a piece of India-rubber tubing). This tube *inside* is bent down like a siphon to the level of low water in the tank; on the *outside* it communicates with the jar receiving the *off*-water. Now it will be seen that as soon as the water reaches the level of the tube passing through the back of the tank, it will flow over into the outer tube communicating with the jar, and this tube, by acting as a siphon, will draw off all the water to the low-water level, which in my aquarium is about two gallons. This is of course a great saving of trouble, as with only once attending to it, the water is made to rise to the highest level, and, instead of getting heated in the aquarium by remaining there, is drawn off into darkness again; and I think that with this arrangement it is almost impossible that the water should get foul, except by the grossest neglect.

It occurred to me, however, that it would be much better to draw the water off from the deeper parts of the tank, instead of from the surface, as it is in these dark parts and corners of an aquarium that the sulphides and other evil gases are so prone to form; but how to draw off, by a self-acting arrangement, the water from the bottom, and at the same time make it stop at the required limit, for a long time puzzled me. I, however, hit upon the following plan:—A piece of gutta-percha or glass tube is made to lead from the bottom of the tank, and fixed firmly into a much larger tube, open freely at the top to the air, into which the tube rises. The projecting end of the running-off tube is now fixed into the large open end of this tube, out of which it draws the water, which of course keeps rising to the general level through the bottom

of the tube.\* The advantages of this contrivance are twofold: firstly, drawing off the vitiated bottom water; and, secondly, preventing the escape of small animals by the pipe.

In my aquarium arranged as above I have kept a star-fish (*Uraster rubens*) in a perfectly healthy state for twelve months, as also several limpets, which I consider difficult to keep in health. I have also noticed the spontaneous appearance of a beautiful form of Medusa this summer, and I have had tubularia develop finely. The aquarium is much exposed to the weather, near an open window, and has never been cooled in summer or warmed in winter; and during the residence of the above-named star-fish in the tank, the water has been above 80° Fahr., and at another time ice has been all over its surface.

I hope to give in a future paper some account of the habits of the Echinoderms which I have observed.

HERBERT INGALL.

1, Champion Grove, Champion Hill.

## THE CURLEW.

(*Numenius arquata*.)

ABOUT the end of July, or beginning of August, great numbers of shore birds come into our harbours, and find their way from the mouths of the rivers to a considerable distance inland. Grey Plovers, Godwits, Knots, Whimbrel, Greenshanks, Redshanks, Dunlin, and many other "waders," continue to arrive until the end of August, and the shores and mud-flats which were so deserted during the summer while the birds were away nesting, now present a most animated appearance. Flocks of various species, and of various sizes and colours, from the tiny brown Stint (*Tringa minuta*) to the great grey Heron, are scattered over the ground in all directions; now feeding busily as they follow the receding tide, now flying with noisy call to some more attractive spot. As we look down upon them from the sea-wall, they appear to be all much of the same colour, and are difficult to distinguish upon the brown mud over which they are running. See them in the air with upturned wings, and what a different appearance they present. As the sun strikes upon the pure white of the underparts borne swiftly onwards by rapid wings, the eye is almost dazzled at the bright contrast. Individuals are soon lost to sight as they fly closer together, and the entire flock, gradually lengthening out, sweep across the harbour like a long wave, now light, now dark, as the under or upper portions of the plumage are presented to view. Naturalists who visit the sea-side at the period of migration to which we have alluded,

\* The water is run *into* the tank by a jet after the manner described by Mr. Meltzer.



cannot fail to admire the wonderful and graceful evolutions which these birds perform upon the wing; whilst those who reside upon the coast throughout the year must hail with satisfaction the arrival of these feathered strangers, whose presence adds so much to the beauty of the scenery, and relieves, to such an extent, the monotony of sea and sky.

We have always had a partiality for "lang nebbit things," as our Scotch friends call them, notwithstanding the supposed connection between a long bill and a suspicious character,\* and have experienced more real enjoyment in the pursuit of them than many who have never tried it would suppose. To one who is fond of shooting, the various kinds of Sandpipers afford much sport at a time when game is not in season. They fly like Snipe, and require some little exercise of skill to bring them down, especially if crossing rapidly from right to left, or *vice versa*. Then, they are excellent eating, and are therefore not useless when killed, like many species of sea-birds. Again, to the inquiring naturalist, their various plumages and the seasonal change which each undergoes—their actions and habits—the nature of their food—the different appearance of different species at a distance when on the ground and in the air—the various calls and alarm-notes—afford an endless source of amusement.

The greater portion of the flocks which visit us in autumn consists of young birds which are on their way southwards for the winter. The old birds are seen on their way to the north in May, and after an absence of six or eight weeks they return with their young as soon as the latter are able to fly. The majority of our shore birds annually perform this double migration; but there are many species which remain in limited numbers to nest in this country. Amongst these are the Golden Plover, the Ringed Plover, the Oyster-catcher, the Common Sandpiper, the Dunlin, and the Curlew.

The Ringed Plover and the Oyster-catcher remain near the shore, and lay their eggs upon the sand or shingle, as the case may be. The common Sandpiper betakes itself to the north country burn-sides, and generally makes its nest at no great distance from the water; while the Golden Plover, Dunlin, and Curlew go on to the moors and peat-bogs, and bring up their young in the wildest and most unfrequented spots.

When walking over the moors in May we have repeatedly startled a Curlew from amongst the tall heather, and have satisfied ourselves on these, as on other occasions, that this wary bird depends more upon the sense of sight than hearing to save itself from its enemies. Ever suspicious, ever on the alert, it is a most difficult bird to stalk unless some

good cover intervenes to screen your approach. Now and then upon the coast you may steal a march upon a flock under shelter of a sea-wall; but, as a rule, they keep too far out from the shore to be within reach of a gun from the wall. We have found it a good plan to "lay up" at a spot in the usual line of flight about an hour before high water. As soon as the mud is covered, they leave the harbour, calling loudly at intervals to one another as they fly, and by imitating their call, while lying concealed, we have repeatedly brought a Curlew overhead and within shot. Another plan is to go down the harbour in a gunning-punt, with an ordinary double gun, at low water, and work along the numerous channels which intersect the great mud flats. In this way you can often get, unperceivedly, within shot of a flock of birds, and secure even the wary Curlew.

On one occasion we were lying in a punt in "a drain" (as the small channels in the Sussex harbours are called) a little below a point where another "drain" intersected it almost at right angles. In the latter we had marked down two Curlews when several hundred yards off, and observed that they were feeding towards the junction of the two "drains." It is always a piece of luck, if birds feed towards you after you have got as near to them as you can without alarming them. And this was the case in the present instance. The Curlews waded up the side of the drain, which was much shallower than the one we were lying in, and in about ten minutes one of them stepped out upon the flat within twenty yards of the punt, and for a moment seemed perfectly scared. We at once cocked the gun and sat up; with a weird scream the bird took wing, and in another second fell dead upon the mud. His companion rising out of the drain some yards further off, was only winged, and led us a rare chase over the ooze before he was secured. This incident shows that the Curlew depends for safety upon his keen sight, and not upon his power of scent, otherwise the bird in question would never have walked within a few yards of the punt, which he could not see until he had stepped upon the bank.

In the "Zoologist," for 1856, Mr. W. H. Power has given an account of the way in which the fishermen at Rainham, in Kent, decoy Curlews within shot. They train a red-coloured dog (as much like a fox as possible) to prowl about and attract the attention of the birds while the gunner lies hidden in a dyke. As soon as the birds chase the dog, which they frequently will do, he draws gradually towards his master, until a shot is obtained. Sometimes two or three Curlews are killed at a time in this way; but the plan is said not to answer with a large flock. We can confirm its success, however, with a single bird, for we once killed a Heron which we should probably never have got near, had not a

\* See Sir Walter Scott's "Black Dwarf," chap. ii.



red setter attracted its attention, and on being whistled to, brought up the bird within shot.

Those who have had much experience in shore-shooting must have remarked how much Curlews differ from one another in size. Whether this difference is dependent upon age or sex is a point still discussed by naturalists. We have hitherto been inclined to believe that the variation is owing to age; but as this conclusion has been drawn chiefly from external appearances, and in a few instances only from actual dissection (for we generally eat all the Curlews we get), and as in the case

at the extremity of the bay at Holywood Warren, awaiting the flight of these birds from Harrison's Bay and Conswater, whence the flowing tide would drive them from particular banks respectively two and three miles distant from any station. The call from the first-named locality sounded quite near, and from the latter distinct, though much more faintly; the state of the tide at the time evincing with certainty that all the banks except the two alluded to were covered too deeply with water for the birds to be on them. Shore-shooters are well aware of this circumstance."

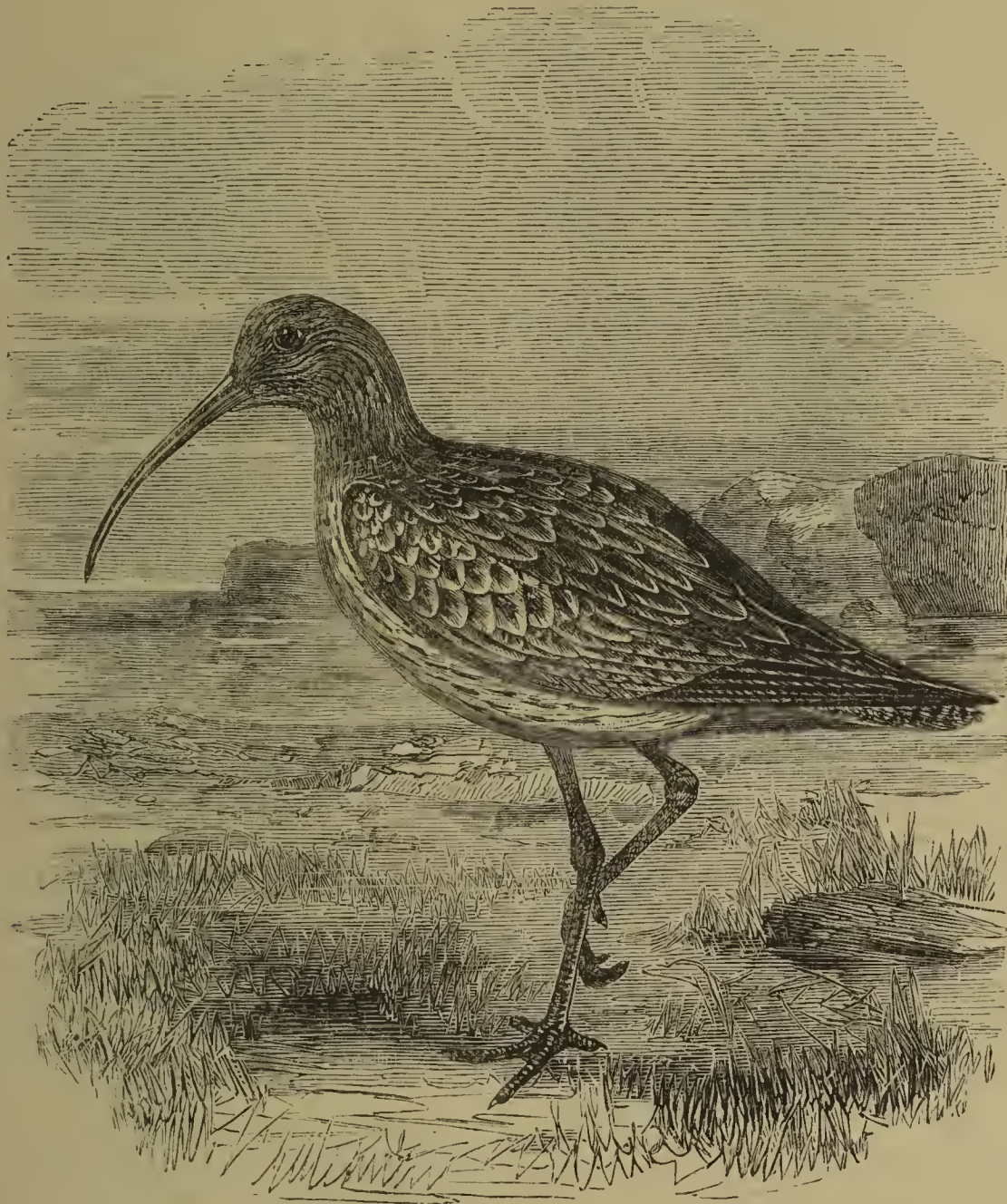


Fig. 172. THE CURLEW (*Numenius arquata*).

of other waders, for example the Bartailed Godwit, the female has proved to be invariably much larger than the male, it is possible that the same rule may hold good with the Curlew.

The note of the Curlew is by far the loudest uttered by any of our grallatorial birds. That observant naturalist William Thompson says, in his "Natural History of Ireland" (Birds, vol. ii. p. 195): "It will perhaps be scarcely credited that it can be heard at the distance of nearly three English miles; yet under peculiar circumstances such is the case. I have heard it so on calm moonlight nights when

Besides its usual cry of "Cou-r-lieu, cour-lieu," there is another which sounds like "wha-up;" from which latter cry the bird in Scotland has derived the name of "Whaup;" and in the spring of the year, when pairing, a softer note is frequently heard, which sounds like "whee-ou, whee-ou."

At one time this bird was a favourite dish with wealthy *gourmands*,\* but is now apparently quite

\* In the Lord North accounts appears the following item:—"Kyrlewes to be hadde for my Lordes owne Mees at pryncipall Feestes, and to be at xijd. a pece." Similar items are to be found also in the L'Estrange "Household Book."



out of fashion, except with a few knowing ones at the sea-side, and those sportsmen who have proved by experience how good a bird it is when roasted.

The food of the Curlew is very miscellaneous, consisting of all sorts of marine mollusca and crustacea, worms, small fish, and vegetable matter, invariably accompanied with a quantity of sand or small particles of grit. The bird is especially fond of crabs, and we have sometimes killed a Curlew so gorged with crabs and shrimps as to be offensive to the smell and not agreeable as food.

Those who are familiar with the works of Professor Wilson must remember his admirable description of the feelings which he experienced when stalking a Curlew.\* "At first sight of his long bill aloft above the rushes, we could hear our heart beating quick time in the desert; at the turning of his neck, the body being yet still, our heart ceased to beat altogether—and we grew sick with hope when near enough to see the wild beauty of his eye. Unfolded, like a thought, was then the brown silence of the shy creature's ample wings, and with a warning cry he wheeled away upon the wind, unharmed by our ineffectual hail, seen falling far short of the deceptive distance, while his mate, that had lain couched—perhaps in her nest of eggs or young, exposed yet hidden—within killing range, half running, half flying, flapped herself into flight, simulating lame leg and wounded wing; and the two disappearing together behind the hills, left us in our vain reason thwarted by instinct, to resume with live hopes, rising out of the ashes of the dead, our daily disappointed quest over the houseless mosses. Yet now and then to our steady aim the bill of the 'Whaup' disgorged blood, and as we felt the feathers in our hand, and from tip to tip felt the outstretched wings, fortune we felt had no better boon to bestow, earth no greater triumph." Who has not at one time or other experienced feelings such as these, and lacked the power of words to describe them?

J. E. HARTING.

#### NATURAL BLINDNESS.

INSTANCES of blindness from birth are so exceedingly rare among human beings, and when they do occur are looked upon with so much sympathy and commiseration, that it is hard to realize the fact of there being myriads of beings among the lower animals, which, from generation to generation, never see the light of the sun. I am speaking now of creatures whose organization is comparatively perfect, and in whose structure the eye, as a rule, forms a prominent feature; *not* of those anomalous beings which seem as though they were created solely to fill up the gap—if gap

there be—between the animal and the plant kingdoms—the infusoria, the sponges, "et id genus omne." There is no need, in fact, to descend so low in the scale of existence, for natural blindness occurs in nearly every department of nature, from mammals downwards.

The members of the Mole tribe stand pre-eminent among blind or purblind animals, and "as blind as a mole" has passed into a proverb. Our native species, *Talpa Europæa*, is vulgarly believed to be in this condition, but its eyes, though very minute, are quite sufficient for the purposes of an animal whose habits are almost entirely subterranean. In the Water-mole of North America the power of vision is reduced to a minimum, for the opening to admit the light is so minute, that a human hair can scarcely be thrust into it. At least two moles, however, are really blind; these are the *Talpa cæca*, of Southern Europe, and *Chrysochloris inaurata*, the Gilded Mole of the Cape of Good Hope. In these animals a stout membrane is actually stretched across the eye, so that life must be a constant game of blindman's buff with them! In Eastern Europe, again, is a certain rodent, the *Spalax typhlus* of the Russian naturalist Pallas, whose eyes are so minute, and so deeply set in the head, that vision appears to be entirely out of the question. Curiously enough, this animal bears a strong external resemblance to a mole. In the wonderful mammoth caves of Kentucky, U.S., there are found various animals which pass their whole lives in entire darkness, and which are, in consequence, totally blind; among them are two species of rat, and at least two forms of bat.

I am not aware of any example of a blind bird, nor is it likely that such a defect should exist in animals whose mode of life necessitates quickness of movement and rapidity of action.

In the class of reptiles we have the Blindworm (*Anguis fragilis*) credited with a lack of vision, as indicated by its ordinary name; but this is a popular error; the so-called Blindworm can see with great ease and distinctness. Not so its curious relative *Proteus anguinus* from the Great Adelsberg caverns of Carinthia, which is certainly blind, the organs of sight being reduced to scarcely visible specks below the cuticle. The same malformation occurs in the genus *Typhlops*. *Amphisbæna* and *Cæcilia* are also, in all probability, totally blind; but the question seems to be hardly decided with any certainty. The fact is, the members of the last three genera live principally on ants, termites, and "such small deer," and are therefore almost entirely subterranean in their habits,—a circumstance which, while it favours the probability of their blindness, renders accurate observation difficult.

At least two fishes have never yet seen the light of day. One is *Amblyopsis spelæus*, living in lakes

\* "Recreations of Christopher North," vol. i. p. 36 (1864).



in the great Kentucky caverns, far removed from access to the solar ray; the other is the Myxine (*Gastrobranchus cæcus*), a small eel-like animal found on our own coasts, where it is parasitic on larger fish, clinging to them by means of its mouth, which is furnished with a powerful sucker, and extracting their juices for its own benefit.

It is, however, among insects that natural blindness most frequently occurs, and the beetles supply us with the greatest number of examples. Some of them are destined to spend their existence deep in the bowels of the earth, and these are almost invariably without eyes. The caves near Adelsberg have been thoroughly investigated by Professor Schiödte, who found, among others, a Carabid, *Aphænops Leschenaultii*, a Staphylinid, and two Sylphids,—*Adelops Pyrenæus* and *Pholemon Querilhaci*,—all with names ugly to pronounce, but unfortunately without any English equivalents.

Indeed, wherever the conditions of life are such that the animal rarely or never comes in contact with the light of the sun, the eyes are almost certain to be obsolete; or, at any rate, so imperfect, as to be practically useless. Such is the case with *Anommatus obscurus* among the Carabids, with the xylophagous or wood-boring *Langelandia anophthalma*, and with another beetle widely separated from these in habit and structure,—*Claviger foveolatus*, whose strange fate it is to live—where few, perhaps, of our readers would think of looking for it—in the interior of the nest of the yellow ant (*Formica flava*).

Among the *Physapods*, or Thrips, the eyes are usually conspicuous enough; one species, however, exists in which these organs are altogether wanting,—the *Aptinothrips rufa* of Halliday. It is a British species; and I believe little or nothing is known of its habits. The order of *Thysanures* (Springtails), in which also the eyes are for the most part sufficiently evident, affords a blind species discovered by Schiödte in the caves of Adelsberg.

In the Neuropterous order, the same which embraces the Dragon-flies and May-flies, to whom may well be applied the Homeric title of ox-eyed (*Boöpis*), so large are their organs of vision, is placed the curious family of Termites, misnamed White Ants. Like ants however, a termite community is divided into castes, each of which has its distinct duties assigned to it; and of these the workers and soldiers are totally blind. From our point of view the idea seems eminently absurd, of engaging a host of workmen to build a city, or of employing an army of warriors to defend a territory, none of whom can boast of an eye to guide them in their toils, or to aid them in watching the movements of the enemy. But in fact this is one of the many cases in which analogy utterly fails, when comparisons are attempted between the functions of the lower animals and those of the lords

of creation. There are no mightier or more durable structures on the face of the earth, looking to the relative size of the builders, than those raised by termites; nor are there any animals existing better organized, or fitter to take the offensive when needed than these “born gladiators,” as the Rev. J. G. Wood aptly designates them. Termites, whether they see or not, are essentially shunners of light; for, although denizens of the sunniest regions of the globe, they never by choice expose themselves to the solar ray, invariably travelling either under the soil, or through passages and tunnels, which they themselves construct with marvellous rapidity. The true Ants belong to the Hymenopterous order: in no case are their organs of sight very well developed, the number of separate facets in their compound eyes rarely exceeding fifty, whereas most insects count them by thousands. But many of the tropical ants are either absolutely blind, or furnished with mere specks by way of eyes. Among them may be named the species of *Eciton*, which traverse, in countless myriads, the forest wastes of South America, carrying death to every creature that cannot get out of their way in time; and the Driver (*Anomma arcens*), which is equally prolific, and equally destructive in Western Africa. None of these curious insects can guide themselves on their marauding expeditions by the faculty of sight, nor do they ever see the prey which has the misfortune to fall into their clutches.

Blind spiders have been detected in the great natural caverns of both Europe and America, and also various crustaceans. “In this country,” observes Gosse (“Romance of Nat. Hist.”), “we possess at least four species of minute shrimps, belonging to the genera of *Niphargus* and *Crangonyx*, three of which are absolutely blind; and the fourth, though it has a yellow speck in the place of an eye, probably so. All these have been obtained from pumps and wells in the southern counties of England, at a depth of thirty or forty feet from the surface of the earth.”

It is needless to carry our inquiries further, as from this point the power of vision becomes rather the exception than the rule; whole orders of animals living and dying without ever gazing on the glorious luminary which bathes them in its light, though doubtless they get as much enjoyment from its life-giving rays as do creatures gifted with the largest and most complicated organs of sight.

Although the facts connected with natural blindness among the lower animals have long been known, it is only lately that the subject has been examined from an anatomical point of view, at least as regards the insects. This has now been done by a French savant, M. C. Lespès, who communicated the result of his investigation to the Académie des Sciences of Paris, in the year 1867, in a short paper, wherein he observes: “The absence of the eye is not the characteristic of a distinct family, several genera belonging



to different families presenting the same anomaly. None of these insects having hitherto been made the subject of anatomical study, I examined the nervous systems of five, the only ones I was able to procure in sufficient quantities for the purpose; indeed many of the species are so minute, that it is impossible to dissect them. These five species are all coleopterous, viz:—*Aphænops Leschenaultii*, *Adelops Pyrenæus*, *Pholemon Querilhaci*, *Claviger Duvalii*, and *Langelandia anophthalma*. In every one of these the organ of sight is entirely wanting, and its annihilation has also involved the destruction of the optic nerve, and even a portion of the nervous centre; for the cerebroid ganglia, in lieu of forming a mass of matter disposed transversely in the head, take the form of two elongated nearly parallel bodies. This form of ganglia recalls the same organs in certain larvæ, which are also blind, but of which the complete insect possesses eyes."

From this description it would seem that the phenomenon is a case of arrested development.

Havre.

W. W. SPICER.

## ZOOLOGY.

THE CARRIER PIGEON.—With respect to Sir John Ross's pigeons, as far as I can recollect, he dispatched a young pair on the 6th or 7th of October, 1850, from Assistance Bay, a little to the west of Wellington Sound; and on the 13th of October a pigeon made its appearance at the dovecot in Ayrshire, from whence Sir John had the two pairs of pigeons which he took out. The distance direct between the two places is about 2,000 miles. The dovecot was under repair at this time, and the pigeons belonging to it had been removed, but the servants of the house were struck with the appearance and motions of this stranger. After a short stay, it went to the pigeon-house of a neighbouring proprietor, where it was caught and sent back to the lady who originally owned it. She at once recognized it as one of those which she had given to Sir John Ross; but, to put the matter to the test, it was carried into the pigeon-house, when, out of many niches, it directly went to the one in which it had been hatched. No doubt remained in the mind of the lady of the identity of the bird. By what extraordinary power did this interesting bird find its way, and by what route did it come?—*Yarrell, History of British Birds.*

BIRD NOTES.—Spending a few days in the country in a house with a thatched roof, in which the birds had for some years been undisturbed, I had opportunities of observing something of the habits of the Swift and Starling, a note of which may, perhaps, interest your readers. All the nests of the Swift, which I examined, had each three eggs, one of them

a shade smaller, and a little less pointed than the other two. Is this common? The general opinion, I believe, is, that the Swift lays only two eggs. Sitting under a shady sycamore immediately in front of the house, late in the evening, I noticed that the birds left their nests for an airing, or, perhaps, for food, and, as I remained perfectly still, they circled round me quite close—so close, that I sometimes fancied they touched me with their wings. Some of the birds—males I fancy—made a prolonged sharp quivering noise with their wings in descending, which recalled the "bleat" of the Snipe; lasting a shorter time, as Swifts fly so much more rapidly than Snipe, but as distinctly marked in tone. Does this tend to throw any light on the vexed question as to the mode in which the peculiar bleat of the Snipe is produced? I have myself no doubt that it is made by the wings, as it is never heard except when the bird is on the wing and descending, and in a *slanting position*. The Starlings carried something in their bills, not only when entering the nest to feed their young, but also when leaving it, which they let fall at some distance. On examination this was found to be the droppings of the young birds, which they carried to a distance, and thus kept the nests clean. It is generally supposed that the Missel Thrush banishes the Song Thrush. I did not find this to be the case. One Song Thrush had a nest in the ivy, another in the hedge, close by; in a forked branch was a nest of the Missel Thrush: they seemed in no way, so far as I was able to observe, to interfere with one another. There was certainly no visible hostility on the one side, or token of fear on the other. In the adjoining planting, where Song Thrushes are plentiful, there were at least five nests of the Missel Thrush this spring.—*J. A. Kerr, Donegore, co. Antrim.*

AGROPHILA SULPHURALIS (Spotted Sulphur).—A single specimen of this rare little Noctua flew in to our lamp on the 22nd of June; it was in very fine condition, apparently just out of the chrysalis.—*H. C. Leslie, Erith.*

THE GREATER SPOTTED WOODPECKER (*Picus major*, Linnæus).—I purchased a young bird of this species last year; it was kind enough to be reared without difficulty, and to live in the same cage on pretty peaceable terms with several other birds, both hard and soft-billed. It moulted in November, had three or four fits, but pulled safely through and came out in fine male feather. His friendliness to the birds who already had possession of the cage was quite satisfactory, but when a new one was introduced he always demanded the toll of a mouthful of feathers. He seemed to dislike brown birds most, and pecked a poor Woodlark so severely that it died in consequence. I have since made a point of removing him for a time to another cage on such



an occasion, and when he gets back again he behaves with the courtesy of a visitor, and is polite to all. On the 11th of last June I was fortunate enough to obtain four more of the same sort, a week old; after a few days we introduced them to the old "Pecker," who was, however, so fierce that they were at once removed. At the age of a fortnight one of them was just able to peek, and they were then put again with great caution into the aviary and the old one taken out. When restored a few days after, he was very civil, and finding both that his young kinsfolk had no design upon his comfort, and that they did not feed sufficiently well of themselves to be able to dispense with our attention, he kindly took this little matter off our hands, and for several days dropped food into their mouths with a care and regard little short of paternal. They are now all living on very fair terms, and sometimes group themselves very prettily together about the top of their log in the full brightness of the afternoon sun.—*T. S. Carte.*

THE SEA-HARE.—Away down the gentle slope till we come to the line where the wavelets are kissing the rock, where the next step would put us into King Canute's circumstances, where the sea is washing to and fro the shaggy weed, and just preventing it from assuming the shrivelled and blackened condition into which the tufts a little above are fast falling under the baking powers of this June sun; and here, on these very weeds, now submerged, now dry, are crawling some uncouth beings of a dark liver-colour or purple-brown hue. The creature passes by the name of Sea-hare (*Aplysia punctata*), a not inappropriate designation, for I have often seen it in postures when the resemblance to a crouching hare was spontaneously suggested. Around Weymouth, where it is common, the fishermen and shore boys call it the sea-cow, which is not a bad hit, though not so happy as that of hare. In each case, the feature which strikes the imagination and suggests the comparison with the quadruped, is the pair of tentacles which stand erect, but a little diverging from the back of the head, and which consist of an expanded lamina unfolded at the base, and, as it were, cut off slantingly so as to look like a hare's ears. There are, indeed, two pairs of tentacles of similar structure; but the front pair are more commonly stretched forward horizontally, and held near the ground, so as to be much less conspicuous.—*A Year at the Shore.*

DIFFLUENCE OF KOLPODS.—One of the most surprising phenomena in the study of Infusoria is their disorganization by diffluence. This decomposition is either entire or partial. Muller has seen a kolpod (*Kolpoda meleagris*) melt away until scarcely 1-16th of his body remained; the rest con-

tinuing to swim about as if nothing had happened. The Infusoria present still another kind of decomposition. If we approach the drop of water in which the animalcule lives with the barb of a feather wet with ammonia, the animal ceases its swimming motion instantly, although its cilia still vibrate rapidly. Suddenly, at some point of its circumference, a notch is formed, which increases more and more until the whole animal is dissolved. If, while this process be going on, a drop of pure water be added, the decomposition is at once arrested, and that which remains of the animalcule begins to move and swim as if the ammonia had never been in the neighbourhood, and had not dissolved the greater part of its substance.—*The World of the Sea.*

EGGS.—NOTICE!—There was an audacity of statement in an advertisement in your last number, headed "Eggs, Splendid Varieties," and signed "J. A. De Verny, Esq., Valley, Anglesea," which could only have imposed on the veriest tyro. But for the sake of such, it may be as well to state that no such person as De Verny is known at Valley, and that letters addressed to him are called for at the post-office there by a certain dealer in eggs.—*H. B. Tristram.*

WHITE ANTS, OR TERMITES.—That such diminutive insects—for they are scarcely the fourth of an inch in length—however numerous, should, in the space of three or four years, be able to erect a building twelve feet high and of a proportionable bulk, covered by a vast dome, adorned without by numerous turrets and pinnacles, and sheltering under its ample arch myriads of vaulted apartments of various dimensions, and constructed of different materials; that they should, moreover, excavate in different directions, and at different depths, innumerable subterranean roads or tunnels some twelve or thirteen inches in diameter, or throw an arch of stone over other roads leading from the metropolis into the adjoining country to the distance of several hundred feet; that they should project and finish the, for them, vast interior staircases, or bridges, lately described; and finally, that the millions necessary to execute such Herculean labours, perpetually passing to and fro, should never interrupt or interfere with each other, is a miracle of Nature, or rather of the Author of Nature, far exceeding the most boasted works and structures of man; for did these creatures equal him in size, retaining their usual instincts and activity, their buildings would soar to the astonishing height of more than half a mile, and their tunnels would expand to a magnificent cylinder of more than three hundred feet in diameter, before which the pyramids of Egypt and the aqueducts of Rome would lose all their celebrity and dwindle into nothings.—*Kirby, Introd.*



## BOTANY.

HOLLY IN FULL BERRY IN JULY.—In the immediate neighbourhood of the Macduff Railway Station there is now a tree full of berries, bright scarlet as at Christmas. On other trees a few have been observed till lately, but on the one indicated they are still in all their pristine beauty. Is such an occurrence common, or how is it to be accounted for?—*J. D.*

CYTISUS ADAMI.—Two fine specimens—the first I had seen, and which not a little astonished me—of this tree were in profuse flower this season in the Earl of Fife's policies at Duff House. Some of the large branches bore yellow flowers, and the branchlets purple, and *vice versa*; but, so far as I observed, no one large branch bore the same flowers throughout. Does not this look like hybridization rather than grafting? The effect produced by the variety and blending of the colours was strikingly beautiful. Can any of your readers say whether the plant comes true from the seed?—*J. D.*

ANDROMEDA POLIFOLIA (L.) IN IRELAND.—In the *Cybele Hibernica* there is some confusion as to the distribution of this plant. On p. xliv, "Distribution in the Districts," it is stated to occur in 1, 3, 4, 5, 6, 7, 9, 10, 12. On p. 181, under the heading "Districts," we find 1, 3, 4, 5 (*i. e.* in four only of the twelve districts); whereas in the subsequent record of habitats, we have localities assigned in all the districts given on p. xliv, omitting 10. Nor does the confusion end here; for all the habitats entered under district 3 ought to be recorded under district 7, as the places named are all in King's County, and not Queen's County. We have then authority given for the districts on p. xliv, omitting 3 and 10. I myself found it in some plenty in June, 1861, on the Bog of Allen, King's County, near my station for *Saxifraga Hirculus* (L.); but had some doubt about it, in consequence of its occurrence in Ireland not being noted in Bentham's Handbook (first edition). A reference to Professor Harvey, of Dublin, however, proved that my diagnosis was correct.—*R. T., M.A.*

SILYBUM MARIANUM (GÆRT.) NEAR OLNEY.—At the end of chapter xv. of Hugh Miller's "First Impressions of England and its People," whilst giving graphic details of Olney and its vicinity, he makes the old woman, his guide, remark:—"I have just been looking for a kind of thistle that used to grow here, but the farmer has, I find, weeded it all out—that he (Cowper) made many fine pictures of. I have seen one of them with Lady Hesketh, that her ladyship thought very precious. The thistle was a pretty thistle, and I am sorry they are all gone. It had a deep red flower set round with long thorns, and the green of the leaves was crossed with bright white streaks." This Hugh Miller infers to have

been the "Wild Thistle." I wish to know if the plant has returned to this habitat near Weston Underwood of late years. I did not come across any sign of it whilst botanizing there in Easter week of the present year.—*R. T., M.A.*

BUXBAUM'S SPEEDWELL (*Veronica Buxbaumii*).—It is now near a quarter of a century since we took a pilgrimage on the "Surrey side o' th' water," to a lane somewhere within our then botanical range of Battersea and Kennington Commons, our object being the then rare Buxbaum's Speedwell. We were successful in our search, having found a few plants, which delighted us very much on account of the conspicuous blue flowers of the species when compared with its congener, *V. agrestis*. We made a note of the fact, but dared not to catalogue it as a British plant, as Sir J. E. Smith had not admitted it into his English Flora. Since then it has become so common an agrarian weed, that it is, at least, admitted as fairly naturalized, and, indeed, seems to have as much right to be considered a native as the other agrarian forms of the genus. In the new edition of "English Botany," by Professor Syme, will be found an exquisite drawing of this plant, fig. DCCCCLXXIII. (we wish they had put English numerals), and we have before us specimens so fine that they might have sat for the portrait referred to. It is all over the arable parts of our farm, situate on the oolites, and one year a fifty-acre field was absolutely covered with it. Indeed, with us it seems to have usurped the position of the *A. agrestis*, and to divide occupancy with the *V. hederæfolia*, the Buxbaums and Ivy-leaved Speedwell being very abundant, but not so the procumbent form, which we have in other localities observed to be so common. A counterpart to this note may be pointed out as having occurred in the Cheltenham district. Some thirty years ago we used to find the pretty Marsh Speedwell (*V. scutellata*) "in a marshy bit of ground on the eastern border of Uckington field;" but now this wide field has been enclosed, the marsh drained, and we fear, that this plant, like some others, has at least been lost to an accustomed locality; and so it is, that while intercourse with foreign countries brings us new forms in our imported agricultural seeds, the "march of improvement" is elbowing out many an aboriginal.—*J. B., Bradford Abbas.*

BOTANICAL ANALYSIS.—Dr. Griffiths's "System of Botanical Analysis," applied to British natural orders of plants, is likely to prove a very useful little manual for beginners. The tabular form is adopted, and the orders are arranged according to an artificial scheme. There are, of course, many objections to artificial synopses, as one or two characters by themselves do not give an accurate idea of order or genus, yet such keys may prove valuable helps, if supplemented by close practical study of differences and affinities.



## MICROSCOPY.

**VIBURNUM LANTANA.**—This plant, so common in the hedge-rows of chalk districts, is popularly known as the Wayfaring tree, or Mealy Guelder Rose. It affords very beautiful examples of sphæraphides and stellate hairs. The former have been figured from a species of Goosefoot (*Chenopodium*), in a late number of SCIENCE-GOSSIP, with reference to Professor Gulliver's observations in the 4th volume of the *Popular Science Review*, but I know not that they have ever been figured in *Viburnum Lantana*. Whether the beautiful hairs of this plant have been depicted in the interesting and important series on this subject in SCIENCE-GOSSIP I cannot say at the present moment; but they are well worthy of a distinct place in connection with the Wayfaring tree. The sphæraphides occur in cells, so arranged

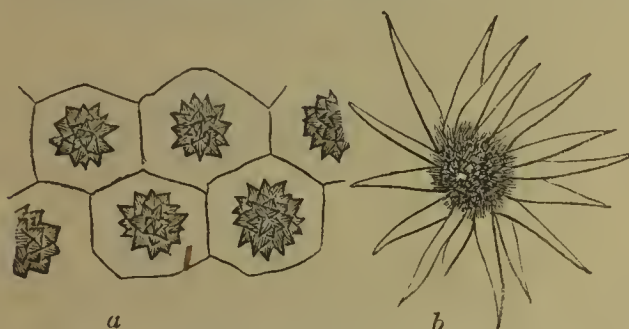


Fig. 173. a. Sphæraphides of *Viburnum Lantana*,  
b. Stellate hair of *Viburnum Lantana*.

together (fig. 1, magnified about 190 diameters) as to constitute an excellent example of what Professor Gulliver names "Sphæraphid tissue." It occurs abundantly in the middle layer of the bark of the young shoots and many other parts of the plant. To see it well, you have only to make very thin sections of the shoot, both transversely and longitudinally, and examine their delicate slices in water with an objective of a quarter-inch focal length. The hairs are beautiful under a lower power; in the figure 2 they are magnified about 45 diameters. And there are few more remarkable and interesting microscopic objects than these sphæraphides and hairs of *Viburnum Lantana*; and so easy is it to see and examine them, that this plant may well afford some very agreeable "half-hours with the microscope" to even the merest novices in microscopic manipulation; and when they have paid such attention to the plant they are likely to be thankful for this pretty addition to microscopic enjoyments. —Q. F.

**MICROSCOPICAL MANIPULATION.**—The members of the Quekett Microscopical Club, especially those who have from time to time attended Mr. Suffolk's lectures, will welcome their reissue in a collected and revised form. Other microscopists, especially beginners, will find this a handy digest of what they desire to know of microscopical manipulation. It does not profess to deal with novelties, or to propound new

discoveries; but its aim, as that of the lectures themselves, is to point out the way to use a microscope and its adjuncts, as well as to prepare objects for examination. Keeping its intention in view, there is not the slightest doubt it will prove useful and welcome. Unfortunately the practical illustrations which accompanied the lectures, are not well compensated for by copious woodcuts; but the descriptions are terse and plain, so that the deficiency will be felt the less. All who require help are likely to find it in this volume, which is neatly got up, and published by Henry Gillman, of Boy Court, Ludgate Hill.

**SCALE OF THE BLEAK (*Leuciscus alburnus*).**—The scales of this lively little fish are very thin and delicate, so much so that when mounted in balsam they are hardly to be seen. The fish itself is very

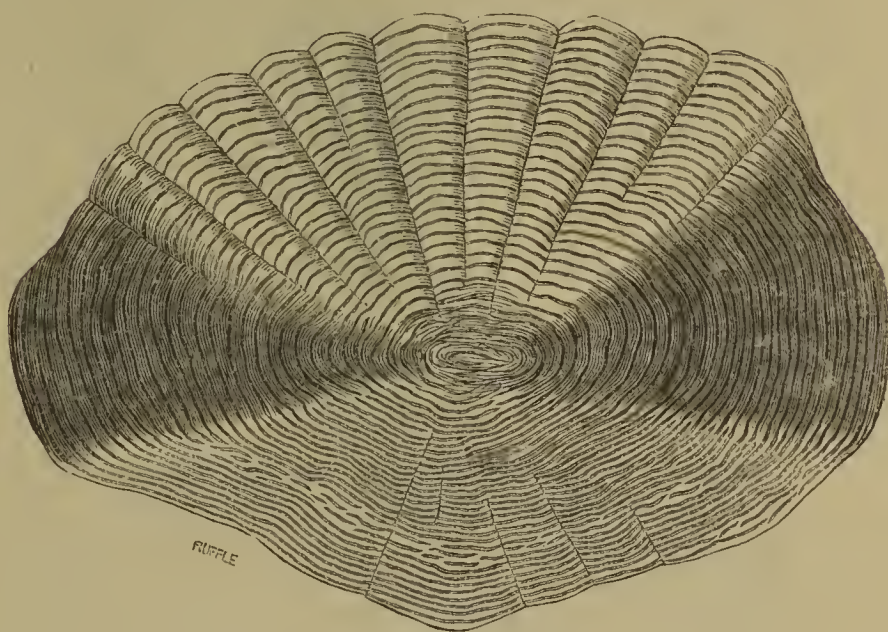


Fig. 174. Scale of Bleak.

much like the Dace, but the scales are quite different, as will be seen by comparing the present figure with that of the Dace at p. 163 (fig. 122) of our volume for 1869. Not only are those of the Bleak proportionately broader, but more delicate, and not channelled inwards from the attached margin, as in those of the Dace.

**PENCIL TAILS.**—At the meeting of the Microscopical Club, on the 22nd July, Mr. S. J. McIntire read a paper on the habits and development of Pencil Tails (*Polyxenus lagurus*), in which much useful and interesting information was given respecting these Myriapods. A figure of the creature and its hairs was given in our first volume (SCIENCE-GOSSIP, 1865, p. 230), to which our readers are referred.

**MICROSCOPIC AMPLIFICATION.**—Mr. E. A. Dickerson, of New York, has recently read a paper before the Bailey Microscopical Club of that city, illustrated by a photograph of *Pleurosigma angulatum*, magnifying power 98 217 diameters. The sphærules are one inch and a quarter diameter.



## NOTES AND QUERIES.

**PLOVER.**—What can be the origin of this name as applied to the members of the genus *Charadrius*, and more particularly to the Golden Plover (*Charadrius pluvialis*), where the idea is retained in the technical name also? The title is, of course, borrowed from the French *Pluvier*, the common name for the same family of birds, and has some reference to rain; but in what sense? Yarrell says, "the term is applied to the Plover 'pour ce qu'on le prend micux en temps pluvieux qu'en nulle autre saison.'" On the other hand a good German authority, Leunis, tells us that the name is appropriate, "Weil er bei Regenwetter (*Pluvius*) pfeift." Hence, the bird is called in the fatherland "Regenpfeifer," or Rain Whistler. It is a knotty point; who shall decide it? I incline myself to the last as the more correct solution. For a similar reason the common Green Woodpecker (*Picus viridis*) bears the name of Rainbird in many parts of the north of England, as being particularly noisy before the occurrence of wet weather. A name, which is in fact a mere translation of that which it bore in the classic days of old Rome for a like reason—*Avis pluvia*. The French also designate it *Oiseau pluvial*, but they say that the name is "onomatopoeie"—to use a lengthy but expressive title—and that it originates in its cry of "Plieu, Plieu;" and that this cry repeated in a plaintive manner is a sure forerunner of rain. The scientific name of the common Horsefly—*Hæmatopota pluvialis*—is reasonable enough, as it is far more active in its assaults before rain than at any other time. But what about the birds?—*W. W. Spicer, Havre.*

**WATER BUGS.**—Are these insects exempt from the fate to which all other small creatures which inhabit the water are liable; that of being snapped up by hungry fish? I have seen it so stated by more than one writer, though I cannot at this moment recall their names. My own observations are certainly in favour of their exemption; as I have never seen one attacked by a fish, though I have seen plenty of mayflies, gnats, &c., caught up all round them. By "Water Bugs," I mean certain members of the Hemipterous order, included by Douglas and Scott in their second subdivision, Hydrodromica. There are nine species enumerated, divided among four genera: *Hydrometra*, *Velia*, *Microvelia*, and *Limnobates*, most of which are common enough in ponds and streams, running briskly over the surface of the water, and rarely if ever diving below it, like their cousins *Corixa*, *Notonecta*, &c. This habit exposes them in a peculiar manner to the assaults of subaqueous enemies. Should it be really the case that they never become "food for fishes," we see a very remarkable provision made for the preservation of these helpless animals in the great battle of life. But for what possible reason are the Hydrodromica so favoured above their fellows? There is neither "mimicry" nor "protective resemblance" in the present case. Perhaps some correspondent can throw light upon the subject.—*W. W. Spicer, Havre.*

**QUERY ABOUT BEES.**—Do bees confine themselves to a single species of plant, when collecting nectar and pollen, during a flight out and home? This is a question which I put to the readers of SCIENCE GOSSIP at p. 272 of last year's volume, a question which still needs solution. It is one which is full of interest from many points of view, especially

in regard to the fertilization of the ovary in vegetables. Now that bees are actively at work, will country subscribers aid in settling the matter by watching individual bees in their excursions? Much useful information may be derived from an accurate record of the circumstances observed.—*W. W. Spicer, Havre.*

**AMHERSTIA.**—What has become of the famous *Amherstia nobilis* of Kew Gardens? Are there any large specimens of that glorious plant in England now?—*H. G.*

**SHELL-FLOWER.**—What is the "bois noir" and the "shell-flower" of the West Indies—also the "music-shell" of Curaçoa? All these are mentioned in Dunbar's "Tropical Scenery."—*H. G.*

**WAKON BIRD.**—What was the "Wakon Bird" of the North American Indians? It was described by Carver and mentioned by Charlevoix and others.—*H. G.*

**POST-OAKS.**—What are the "Post-Oaks" and the "Traveller's Delight," mentioned in Wraxall's "Backwoodsman"?—*H. G.*

**PAO-D'ARCO.**—What are the scientific designations of the "Pao-d'Areo" and the "Massaranduba," mentioned by Bates in his "Naturalist on the Amazons"?—*H. G.*

**LOUIS D'OR.**—What bird is it that is known in the French islands of the West Indies as a "Louis d'or"?—*H. G.*

**MURREL.**—What is the "murrel" of Dunlop's "Hunting in the Himalaya"?—*H. G.*

**TIGER BIRD.**—Which is the "Tiger Bird," and what are the "Moea-Moea" trees of Waterton's "Wanderings"?—*H. G.*

**ARTIFICIAL SWARMING.**—As many of your correspondents seem to be interested in bees, I venture to say a few words on my experiments in artificial swarming this spring. I was in possession of a few hives of black bees, and wanting to become the possessor of some of the Ligurian variety, first gave me the idea of making an artificial swarm,—a friend of mine keeping them having promised me a bar from a Woodbury hive containing eggs and brood. I therefore obtained a Woodbury, and choosing a favourable day, set to work,—the day chosen was May the 16th. I wrapped the bar-frame in flannel, and the whole in brown paper, for, having a little distance to go, I feared the death of the brood, if I were not careful to keep them very warm. On my arrival at home I placed the bar in the empty hive, and having screwed down the top, put it in the place of a strong stock of black bees, which same I moved, after turning them up and shaking them, to the most remote stand in the apiary. The object of turning them up was to make more bees leave the hive than otherwise would have, and thus, together with those returning from the fields, make a good swarm. In two days I took the bar out to see if there were any signs of royal cells, and to my delight found three quite formed and with living inmates. The bees worked hard, or seemed to, for I did not again disturb them until the 10th of June, knowing that by this time the artificially reared queen should have begun to lay. I took out the first comb, and the second, and the third; but all alike quite full of honey and



stored farina, leaving no cells for the queen to deposit her eggs in. There was, however, brood in one of the new combs, begun since her advent; but as this was scarcely four inches long by three deep, it was not much. This sight rather annoyed me, as I saw no remedy at first; but an idea struck me which I immediately acted up to. I had a stock of bees, a swarm of last year, which showed no signs of swarming and which I was willing to sacrifice. I therefore smoked out all the bees, and having secured the queen, placed them all in an empty Woodbury, the royal prisoner in a box with some of her attendants over the hole in the top, which I covered with perforated zinc. I then cut out the four middle combs, containing brood in all stages, tied them into bar-frames, and placed them in the hive containing the artificial swarm. I procured a Ligurian queen from London for the black bees whose queen was prisoner, and so I have now two Ligurianized swarms prosperous, and will in all probability stand well through the winter. This day (1st July) I expected to see the first young Ligurian from artificial No. 1, but being wet I do not think they will show themselves.—*G. C. G.*

GOOD KING HARRY.—Can any correspondent inform me whence *Chenopodium Bonus Henricus*, derives its curious name of "Good King Harry"?—*W. B. G.*

FOWLS.—During the last ten years I have possessed a large number of fowls. I have at present one which was hatched the middle of 1868, commenced laying at Christmas same year, and has never left off, or moulted since. She is dreadfully stumpy-looking, and very shabby, but shows no signs yet of moulting this season. Her appearance and laying prove her to be in good health. Is this a common circumstance?—*C. L. J.*

SOUNDING LEAD.—I am in want of some sort of plummet, or small drag, that will bring up specimens of diatoms, foraminifera, &c., from considerable depths of water. I want to dispense with the tallow process, and I think there is some apparatus made with this object. If some reader would kindly say where it can be got, and the price, or, better still, describe it, I should be much obliged.—*C. L. J.*

BORRAGO (p. 165).—In a folio volume called "The Gardener's Dictionary," by Philip Miller, F.R.S., published in 1768, I find—"Borrigo [or Borago, which signifies much the same as courage, because it is a good raiser of the spirits], Borage." Some of the old botanical writers considered *borago* to be quasi *cor-ago*, and there is an old rhyme which runs, "I borage bring courage." See Johnson's "Dictionary of the English Language," by Latham. The English name also is spelt with the double *r* in the fourth edition of the "Encyclopædia Britannica," 1810. The French *bourrache*, and the German *borretsch*, are further examples of the reduplicated form.—*G. H. H.*

PHACELIA TENACETIFOLIA.—In answer to Mr. D. D. Bennett's query, I would say that there are several varieties of the *P. tenacetifolia*.—I think four, three of which, I believe, may be seen in Jersey, near St. Aubin's. Professor Babington, of Cambridge, has, if I mistake not, a fine specimen of this interesting plant in his garden.—*J. B. Cantab.*

THE QUAIL-CALL.—The following anecdote will serve to show how easily birds are deceived by artificial means. A few years ago, when paying a visit to a friend of mine residing in the Belgian Ardennes, the following occurrence took place. After dinner, as the shades of evening came on, having lighted our cigars, we took a stroll in a neighbouring wood. My friend had in his hand a small call-whistle with which he could imitate exactly the call-note of the Quail. We, being fatigued, seated ourselves on a mossy bank. Admiring the beauties of the landscape, he then began with the instrument to imitate the bird's note, which he continued doing for the space of half an hour, a quail in the distance responding, when, to my surprise, the bird flew into my lap.—*M. J. Teil.*

ACERAS ANTHROPOPHORA.—Does any correspondent know whether this orchid has been found of late years in Gate-Burton Wood, near Gainsborough? Mr. Leonard Grindon, in his somewhat recently published "Field Botany," states it to be fine and plentiful there, on the faith of which a friend and myself visited the wood towards the latter end of June, expressly to ascertain if it was really found so far north, Hooker in his new "Flora" giving its distribution as from Lincoln southwards. We had no difficulty in getting to the right place, since it is definitely indicated on the Ordnance Map, but found only a very damp barren wood—a very unlikely place for *Aceras*, and not "on the chalk" either—covered breast high with a dense forest of *Urtica dioica*, heroically hewing down which, and inspecting every foot of the ground (the wood is of but small extent), we found nothing! Very disappointing to us: and had the author of the statement that sent us to Gate-Burton Wood been upon the spot, I fear the terrible nettle grove would have proved even more unpleasant to him than it did to us! Pastures and copses adjoining we likewise searched, but without result. Has the orchid ever been found there, indeed? Away from the chalk stratum, in a latitude so far north, there seems room for doubt.—*F. Arnold Lees, Meanwood, Leeds.*

VALISNERIA SPIRALIS.—In the July number of SCIENCE-GOSSIP there are two paragraphs, one entitled "Confervæ in Aquaria," the other "*Valisneria spiralis*," pp. 165, 166, both intended to show how aquatic plants may be grown well, and yet tolerably free of confervæ, and both adopt the means commonly recommended in microscopical works. To these I would venture to add my mite on the subject. I have grown the *Valisneria spiralis* for years in a large bell-glass fitted to a mahogany base, and I find when the water used for the plants in town, or pipe-water supplied from an open reservoir showing the character of being above average pure, confervæ grow on the sides of the vase and the leaves of the plant in great abundance, and in a short time. In summer I have seen the sides of the vase covered with a forest of green confervæ in four days, after it was cleared and filled afresh, from the abundance of confervoid spores which the water contained. To keep this in check, a sufficient staff of the *Lymnæus stagnalis* themselves and their ova, most interesting objects of observation and study,—and when they could be got, the *Planorbis corneus*, as one of your correspondents recommends, were added. I think spring water, in which the *Valisneria spiralis* lives well, would be a great hindrance to the confervoid



growth. The following may be regarded as a proof, so far as it goes. Some years ago, wishing to exhibit the Cyclosis in plants at a conversazione, on the 22nd December, I pinched off a few leaves of Valisneria, the plant selected, that I might show the grass-like form of the specimen under the microscope. These leaves were put into a wide-mouthed glass bottle, of about thirty ounces capacity, filled nearly full of spring water, and covered with its accurately-fitted glass stopper. Having served its purpose at the conversazione, it was brought home and set aside on a shelf in a north room, and back from light and heat. Now and again it was taken down, and small portions of the leaf sliced and examined, to see if the Cyclosis went on in the long detached leaf, as it did when recently pinched off from the growing plant. The leaves continued green for about four months, when they gradually became rusty in colour, and not till the middle of June was the change so great as to put an end to the rotatory motion in the cells called Cyclosis. During all this time the water was transparent, and the sides of the bottle free from confervoid growths. The leaves simply, to appearance, underwent the changes of slow decay. Might not the use, then, of spring water and covering the plant vase with glass greatly hinder, if not prevent, the development of confervæ? Since I have mentioned the long continuance of life in the leaf of the Valisneria, I may add that I have had a small bit of the *Nitella flexilis* in a zoophyte trough for upwards of three months at a time, and during all the period the Cyclosis going on actively. Besides, from the axillæ of the buds or joints it pushed out a great many radicles of a fine thread-like form, in which the motion of the granules, &c., was seen to perfection. And as these rootlets went in straight lines downwards in the trough, the motion of the fluid upwards when seen through the microscope with a two-thirds object-glass, and in a good light, looked like a miniature fountain playing, each filament being a splendid *jet d'eau*. Mr. Banks mentions that his Valisneria flowers every summer. Has he had both male and female flowers? I have had abundance of female, but never male flowers.—*J. M. A.*

**TUNNELLING BEES.**—For the last two years my rain-gauge (one of Glaisher's), which is sunk in the ground, has been forced up three or four inches by the Mason Bee. Early in spring they begin, and it lasts for about two months; the soil, when cleared out, is quite pulverized and soft like fine sand. I do not disturb them till they seem to have left, when I restore the gauge to its proper level. It weighs  $5\frac{1}{4}$  lb., and is made of copper, with glass graduated measure, to pour from a cup inside to.—*George Macrae.*

**COWSLIP.**—There can be little doubt that *paigles* is a proper native word for *Primula veris*. The A.-Saxon form for "cowslip" is given by Dr. Bosworth as *cuslippe*; "paigles," called also *pagil*, *pagle*, *peagle*, must be taken as a form of paralysis or palsy. Ainsworth renders cowslip as equivalent to paralysis, in Latin. Culpeper's "Herbal" says: "the Greeks gave them [the cowslip] the name of paralysis." Our word palsy, or paralysis, is derived from the Greek *παρά*, "to pass beside," and *λύω*, "to loosen." The compound means "to set free, to undo or loosen;" in this sense it is equal to the Greek *κλεις*, Latin *clavis*, English "key;" in A.-S. *cæg*, from *cæggian*, "to shut up." This may explain the German word for "cowslip," viz.

*schlüsselblume*, literally "key-flower," from *schliessen*, "to shut;" the Dutch word is similar, viz. *sleutelblæmen*, literally "key-flower," from *sluiten*, "to shut." Paigles is very like the Latin word *pāgella*, "little leaf;" but the analogy is in favour of "loosening, or opening," from the fact that *primula* ranks as the *first* opening flower; it unlocks the icy bonds of winter, and sets free the blossoming of spring.—*A. Hall.*

**ANIMATED OATS.**—The very singular account given in SCIENCE-GOSSIP for July, page 164, of "a field of Barley grown from Oats," reminds me of a question I have long wanted to ask—What are "animated oats"? A young lady showed me some ripe oat seeds, which, when held in the hand, certainly did "hop and skip about," as she said, "like living things." Her idea was, that the oats were full of electricity, and that they became more or less animated according to the amount of electric power or fluid possessed by the person in whose hands they were placed. She declared she felt a tingling sensation in her fingers directly she took the seeds in her hand; but my "imagination" would not carry me so far. I certainly saw the oats "hop;" but I fancied this movement proceeded from some peculiar formation in the awns. The seeds really looked to me like spiders, or insects of some description; but I must stop, or I shall be told I am "fanciful," whereas I only seek for a little information as to where these "animated oats" grow, and why they are so very lively? The ears of barley on oat stalk fairly puzzles me—two different genus of grasses.—*Helen E. Watney, Upper Norwood.*

**MOLLY-HAWK.**—Can any of your readers inform me to what genus the bird found in the southern hemisphere, and commonly called by sailors the "Molly-hawk," belongs? And what is its true name?—*A. Aldridge.*

**CLEANING SHELLS.**—J. C. H. requests information as to the best mode of cleaning the dirt out of small shells which are found dead and full of muck, &c., as boiling them in water alone has signally failed.

**ETYMOLOGY OF COWSLIP.**—I send the following extract in reference to the paragraph signed "Helen E. Watney." "*Cowslip*, sub. (*Cuylippe*, Sax.), so called, according to some, because its smell resembles the breath of cows; but, according to others, because its growing in pasture grounds makes it often meet a cow's lips."—*Rider's Dictionary.*—*R. A. Wellington.*

**THE BERBERRY** (*Berberis vulgaris*, L.).—When we see the brilliant branches of scarlet berries hanging in rich profusion on the boughs of this shrub, we give little heed to the fact that, in all probability, we owe the beautiful sight to the agency of some passing fly or vagrant bee, which has chanced to visit the flowers in the course of the previous summer. I say, "in all probability," advisedly, because I am well aware what an important part the wind plays in the dissemination of the pollen; as any one may prove for himself by simply shaking the bough of a Scotch fir or a yew tree at the proper season, when he will find himself surrounded by a cloud of yellow dust, which is quickly borne away on the breeze. Still we know that the fertilization of the ovary is to a great extent due to the intervention of insects; and had it not been for



these tiny agents, the shrub before us must have been without its chief ornament, and its chief means of continuing the species. The matter is brought about thus. It is the nature of this plant, that the anthers containing the precious pollen should lie in the hollow of the petals, instead of being, as is usually the case, partially or entirely erect, and so ready to discharge its contents on the stigma. In the Berberry the anther lies pressed down, and might, perhaps, so lie for ever without ever performing its proper function, and the yellow pollen might be embosomed in the rounded corolla in idle luxury, were it not for a special adaptation, which alters the whole aspect of affairs. The fact is, the filament which supports the anther is not fixed irrevocably to the lower part of the petal, but is furnished with a hinge, and with a powerful spring at its base. This hinge is of an exceedingly irritable nature, and, no sooner is it touched, than the filament suddenly flies up, presses the anther against the stigma, and then slowly falls back into its former place. This phenomenon may be witnessed at any time by merely touching the base of the stamen with a pin. But if, instead of the human hand, we imagine the foot of a bee or a beetle to be applied to the irritable organ, the same result would inevitably ensue—a circumstance which must occur many times in the day, as the insects in their flight seek for the sweet nectar in the flower-cup of the Berberry.—*W. W. Spicer, Havre.*

AT TABLE.—The custom of frog-eating in France seems to date from the end of the fifteenth century. Champier, writing in 1504, complains of the strange taste of people who eat frogs, and cannot conceive how persons of delicacy can eat "insects" bred in marshes and stagnant ponds. "I have seen the time in which people eat only frogs' thighs, but now they actually eat the whole body, except the head; and, moreover, serve them fried with a little parsley." Yet that the practice was not universal we gather from Palissy, who, in his "Treatise on Stones," says, "It is a thing that one sees every day now, that men eat articles which formerly no one would have eaten for anything in the world. In my time I have known when you could have found very few men who could have eaten either tortoises or frogs." The custom, like that of eating beavers, and that great delicacy, their big, flat tails, probably took its rise in the desire of the fasting, or non-flesh-eating monks, to get something as like flesh as possible; and they, therefore, always reckoned amphibious animals as fish, not flesh. In like manner, though certain monks would not eat pork, they flavoured their vegetables with lard, and many monasteries kept pigs for this purpose. Other monasteries got so far as to eat hashed meat, saying that when meat was so disguised it was no longer meat. Gregory the Ninth condemned this artifice in the Constitution he gave to the Benedictines, and declared that not only was meat forbidden to them, but also hashes and stuffing made of meat.—*The Athenæum.*

EGG VITALITY.—I have just had a singular and somewhat remarkable proof of the vitality of the pigeon's egg. On the 12th inst., at five p.m., I took an egg from the nest of a common dragon, the shell being at the time just raised and cracked by the gentle tapping of the bird, which should, if left with the parent bird, be hatched by mid-day of the 13th. At five p.m. of the 13th (July) I lifted the shell at

the place where it was raised, and saw a slight pulsation. The egg was stone cold at the time. I then placed the egg in another nest which contained young birds four days old: by this it did not get so much heat as with the parent. This morning, the 14th, the bird was hatched, although the egg was twenty-four hours out of a nest.—*Charles J. W. Rudd.*

FLOSCULARIA CAMPANULATA.—It will be interesting to observers to know, that during the past two months, June and July, I have had under observation several individuals of this species, which had attained the height of  $\frac{1}{20}$  of an inch, measured from the foot attachment to the upper surface of the dorsal lobe in its incurved position; the tubes, in all instances, extended well up into their necks; some of the tubes were thickly coated with particles, while others were pellucid and free from such incrustation.—*Charles Cubitt.*

SQUIRREL.—A squirrel was seen carrying off young birds from a nest. It was shot whilst in the act of carrying away a mutilated bird, and the inference is, that the squirrel had devoured a portion of the bird. Can any reader say whether squirrels eat animal as well as vegetable food? Or, whether this was probably a case of the same morbid appetite as is displayed when a rabbit eats its own young ones?—*H.*

AQUARIUM DIFFICULTY.—I have an aquarium in my garden, holding between two and three hogsheads of water (fresh). Unfortunately, a short time since, I put in some plants of *Myosotis*, obtained from a river, and by that means unknowingly introduced some *Lemnææ stagnales*: they now literally swarm, and every green thing is destroyed. Will any one kindly tell what fish or animal I can introduce that will destroy both snails and spawn? I have several nests of sticklebacks just hatched out, and do not wish them sacrificed if I can help it.—*H. J. C.*

DOUBLE BROOD.—Some of your readers may be interested to hear of a particular in the natural economy of *N. cucullina*, which is, I believe, not generally known; viz., that it occasionally has two broods in the year. I obtained several pupæ of this somewhat rare species (from Mr. Harwood, of Colchester) last winter, which emerged at intervals from May 9th to June 5th. Of these a couple paired on the night of May 20th, and the female laid about 100 eggs, of which unfortunately only about half a dozen hatched, and only two larvæ lived to reach any size. One of these died, the other turned to a chrysalis during the first week of July, and emerged, to my great surprise, July 21st. It was a fine female. I ought to have stated that I kept the insects out of doors.—*F. D. Wheeler.*

SWALLOWS' NESTS.—A pair of swallows have this season built their nest within the Girls' National School-room of this town, finding their way in and out through the open windows or ventilators. There, undisturbed by the daily noise of from seventy to eighty children, they are bringing up a small family. This day the Government Inspector of Schools was introduced to this small infant class, and was amused at seeing four or five little heads peeping out on the proceedings below, and keeping up an incessant twittering, as if wondering at the unusual serious faces of their little friends below.—*William Wright, M.D., Shepston, near Stour.*



## NOTICES TO CORRESPONDENTS.

ALL communications relative to advertisements, post-office orders, and orders for the supply of this Journal, should be addressed to the PUBLISHER. All contributions, books, and pamphlets for the EDITOR should be sent to 192, Piccadilly, London, W. To avoid disappointment, contributions should not be received later than the 15th of each month. *No notice whatever can be taken of communications which do not contain the name and address of the writer*, not necessarily for publication, if desired to be withheld. We do not undertake to answer any queries not specially connected with Natural History, in accordance with our acceptance of that term; nor can we answer queries which might be solved by the correspondent by an appeal to any elementary book on the subject. We are always prepared to accept queries of a critical nature, and to publish the replies, provided *some* of our readers, besides the querist, are likely to be interested in them. We do not undertake to return rejected manuscripts unless sufficient stamps are enclosed to cover the return postage. Neither can we promise to refer to or return any manuscript after one month from the date of its receipt. All microscopical drawings intended for publication should have annexed thereto the powers employed, or the extent of enlargement, indicated in diameters (thus:  $\times 320$  diameters). Communications intended for publication should be written on one side of the paper only, and all scientific names, and names of places and individuals, should be as legible as possible. ADDRESS, No. 192, PICCADILLY, LONDON, W.

JONES.—There is not likely to be any difficulty whatever. Subscription to Entomological Society, £1. 1s. per annum. Admission Fee, £2. 2s. Apply to J. W. Dunning, M.A., 24, Old Buildings, Lincoln's Inn.

H. C. L.—The "Snowberry," *Symphoricarpos racemosa*.

T. C. M.—You can obtain all the numbers of SCIENCE-GOSSIP from 1 to 34, or to the present date, from the Publisher.

S. E. H.—They are the stalked eggs of the Lacewing Fly.

E. H.—You must send specimens or name, before we can give any information.

C. F. T.—Stainton's "Manual of Butterflies and Moths" is about 12s. There is no reliable cheaper work. Newman's "British Moths" gives woodcut figures of the species and varieties.

C. B.—Your plants are *Cornus Canadensis*, L., and *Maianthemum bifolium*, var. *Canadense*.—J. B.

R. L. H.—The insect is the Great Saw-fly, *Urocerus gigas*; for figure see SCIENCE-GOSSIP, 1866, p. 181, fig. 167.

Rev. A. C.—The bees are male and female of the Wool-gathering Bee, *Anthidium manicatum*.—F. S.

B. W. (New Zealand).—The Forest-fly is the *Helophilus trilineatus*, Fabr., and the "arboreal crustacean" is a Locust, *Hemideina thoracica*, White.—C. W.

F. B.—The *Allium* is *A. vineale*, var. *compactum*. The *Galium* is, no doubt, what you suppose. *G. verum* and *G. mollugo* hybridize freely. For an account of the forms produced, see Syme's "English Botany," and Grenier & Godron's "Flore de France."—J. G. B.

B. H.—*Adenostyles albifrons*.—J. G. B.

J. P.—*Molinia cærulea*.—J. G. B.

W. E. H.—It is *Cellularia ciliata*, not uncommon round the British Coast.

C. L. J.—Common. Forwarded to Mr. Holland.

J. D.—We are strongly opposed to fictitious names and fancy signatures.

H. M. G.—We have no book which can be recommended for the determination of our common insects, except Lepidoptera and Coleoptera.

G. S. S.—*Lotus corniculatus*, var. *villosus*, and *Medicago lupulina*.—J. G. B.

H. T.—For drying plants, see SCIENCE-GOSSIP for 1866, pp. 164, 186, 213, 237, 256.

J. A. De Verney, Esq., Valley, Anglesea, North Wales.—See advertisement, page civ.

## EXCHANGES.

NOTICE.—Only one "Exchange" can be inserted at a time by the same individual. The maximum length (except for correspondents not residing in Great Britain) is *three* lines. Only objects of Natural History permitted. Notices must be legibly written, *in full*, as intended to be inserted.

CAREX PARADOXA, and many rare Southern and Northern plants for exchange. Correspondence invited from Scotland and Ireland as well as England. Address: F. Arnold Lees, Meanwood, near Leeds, Yorkshire.

WANTED, *Saturnia Carpi* larva or pupa.—Address: T. Stevens, 11, Marlborough Square, Chelsea, S.W.

SCARCE ANIMAL HAIRS, mounted, for other well mounted objects, or good material. E. Wilson, 82, Southampton Road, Hampstead, N.W.

MICROSCOPIC LEAF FUNGI, unmounted, for good sections of wood, unmounted.—H. Durnford, Claremont House, Waterloo, Liverpool.

LARVA OF MENYANTHIDES, *Plantaginis*, *Callunæ*, *Rubi*, *Carpini*, *Fuliginosa*, and *Fascilina*, in exchange for British birds' eggs.—Address: H. Duberly, Wolsingham Rectory, Darlington.

WANTED, Silurian fossils in exchange for mountain limestone, Yoredale and coal measure fossils.—James Spencer, 4, Akroydon, Halifax.

BIRDS' EGGS.—Curlews, Golden Plovers, Snipes, Crows, and Dippers, for other eggs.—A. Pickard, Wolsingham, Darlington.

MARINE DIATOMS (British) in exchange for young oyster cleaned for mounting.—T. Redward, 100, Queen-street, Portsmouth.

VALISNERIA SPIRALIS.—Plants wanted in exchange for well mounted tongues of mollusks.—W. R. May, 120, Liverpool Road, Islington, N.

EXCHANGE.—Sundew (*Drosera rotundifolia*). Stamped envelope and any object of interest to C. P., Post-office, Parkstone, near Poole, Dorset.

EXCHANGE.—Burnet Brand (*Aregma acuminatum*). Stamped envelope and any object of interest to H. P., 12, Margaret-street, Hull.

LEPIDOPTERA.—Good specimens of the Gipsy (*Liparis dispar*), for which I shall be glad to receive offers.—Robert Laddiman, St. Augustine's, Norwich.

FOR EXCHANGE.—*Papilio Machaon*, *Grapta*, *B. album*, and eggs of Red Grouse, Red-backed Shrike, Cuckoo, and Wild Duck.—Address: Joseph Anderson, Jun., Alresford, Hants.

WOOD SECTIONS.—Micro Seeds, &c., in great variety, well mounted, offered in exchange for other slides of good character.—E. Ward, Freehold-street, Coventry.

MELOPHAGUS OVINUS.—"Sheep Tick" mounted in exchange for injection or other good mounted slide.—Send list to A. Allen, Felstead, Essex.

WANTED Vapourer Moths, male and female, and any eggs of insects, for first class mounted objects.—E. W., 48, Tollington-road, Holloway, N.

## BOOKS RECEIVED.

"Scientific Opinion." Part XX. June, 1870.

"Zymotechnic News." January, February, March, 1870. St. Louis, Mo.

"The Popular Science Review." July, 1870. London: Robert Hardwicke.

"The American Entomologist and Botanist." June, 1870. St. Louis. R. P. Studley & Co.

"The Monthly Microscopical Journal." No. 19. July, 1870. London: Robert Hardwicke.

"The Gardeners' Magazine." Part LV. July, 1870.

"On Microscopical Manipulation." Being the subject matter of a course of lectures delivered before the Q. M. C. by W. T. Suffolk, F.R.M.S. London: Henry Gillman.

"Land and Water." Nos. 231, 232.

"Experimental Proofs that the Surface of Standing Water is not Convex, but Horizontal, by Parallax. London: William Macintosh.

"The Animal World." No. 10. July, 1870.

"A Manual of Structural Botany." By M. C. Cooke. Third Edition, revised and corrected. Robert Hardwicke.

"The American Naturalist." July, 1870. Vol. iv. No. 5.

"Proceedings of the Birmingham Natural History and Microscopical Society for 1869." Birmingham: Sackett and Edmonds.

"Le Naturaliste Canadien." No. 7. June, 1870.

"Proceedings of the Lyceum of Natural History of New York."

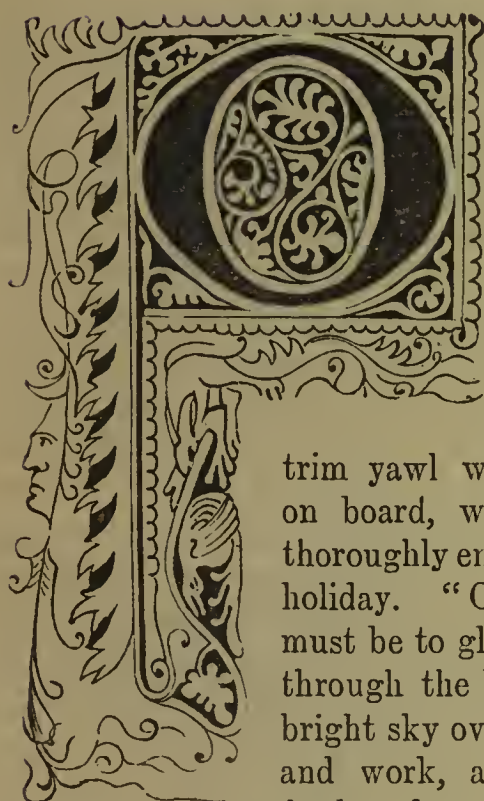
COMMUNICATIONS RECEIVED.—J. E. T.—H. C. L.—G. M.—H. E. W.—L. M. P.—J. C. G.—A. A.—A. H.—J. A. K.—R. B.—R. A.—H. P.—C. P.—J. C. H.—W. R. M.—G. B.—A. C.—A. A., Jun.—F. B.—W. B. C.—S. E. H.—E. H.—R. L.—C. F. T.—J. A., Jun.—E. W.—G. C.—F. C. M.—W. B. G.—J. R. S. C.—M. J. T.—A. H.—J. M. A.—J. D.—H. D.—C. L. J.—E. W.—H. I.—W. E. H.—G. H. H.—T. S.—A. W. W.—H. D.—F. A. L.—J. B.—S. S.—C. J. W. R.—T. S. C.—H. B. T.—T. R.—J. S.—R. G.—A. P.—H. M. G.—C. C.—F. M. H.—G. S. S.





## THE TOWING-NET.

BY MAJOR HOLLAND, R.M.L.I.



H, how I wish we had a yacht, and could go out sailing and looking for curiosities every day like those happy people out there," exclaimed a fair damsel, pointing seaward to a trim yawl with a merry party on board, who appeared to be thoroughly enjoying their summer holiday. "Oh, how charming it must be to glide along so silently through the blue water, with the bright sky overhead, and to read, and work, and chat, while the dredge down at the bottom is filling itself with all sorts of new and wonderful creatures, without any trouble to anybody; and, oh, the thrilling excitement when it is drawn up, to see what it has collected. But, there," she added, evidently labouring under the common delusion that for all explorations beyond low-water-mark, costly and elaborate appliances are indispensable, "these things are only for rich people;" and then she pouted, and her all but overflowing eyes seemed to question the justice of the dispensation which she fancied had placed all the rare things of the deep for ever hopelessly beyond her reach, and limited her "findings" to the dead and mutilated waifs and strays cast up by the tide upon Southsea beach.

Truly it is a pleasant thing to carry on our researches amongst the living things of ocean in a well-appointed yacht, with a convenient apparatus and all the accessories at hand; but the dredge can be worked effectively for all ordinary purposes from a common wherry, with a couple of hands, at the established fare of half a crown an hour; and one hour's work will furnish us with a stock of marine

animals sufficient to fill all the aquariums, pans, basins, and jars likely to be found in an average establishment. The fishermen's children will gladly bring to our doors for a few pence a maund of "them pollywoggles, an' sea-spiders, an' rubbidge wot Father (or, as they call him *Fee-ayther*) an' his mates flings overboard," anathematizing them in no measured terms for getting entangled in the nets; or, if we can summon up courage enough to venture out to see how the weather-beaten, sunburnt sons of toil gather in the harvest of the sea; that stalwart old sea-king "*Fee-ayther*," and his jolly satellites of sea-bear mates will allow us, for a very modest *douceur*, to go out in the smack with them the next time they go a trawling, and then we can pick over the nets for ourselves, and the civility and gentleness of these sturdy wrestlers with the wild ocean, who fight the fierce waves in the winter gales for their hard-earned daily bread, may perhaps furnish a wholesome lesson to some of *nous autres* who have been delicately nurtured, and who fare sumptuously every day; they do not see the good of our pursuits, and there may be just the least possible *soupçon* of pity, not to say contempt, mingled with the wonder with which they contemplate the gentlefolks, "a stowin' away them precious warmint, and all manner o' gubbins, as though it was diamonds and rubies."

The entire fauna of the sea does not dwell in the mud, or close to the bottom; nor are the trawl and the dredge the only engines of the naturalist; the towing-net, though sadly neglected, is one of his cheapest, simplest, and most efficient contrivances; perhaps it is because it is so cheap, so simple, and so easy to handle, that it is so little used; and hence, while we are well up in our fishes and mollusca, we know but little of the myriads of the *Hydrozoa*. Let us see if we cannot learn to construct and use one of these machines for ourselves, "in one lesson, without the aid of a master."

First, we go to the toy-shop and buy a child's wooden hoop about twenty-two inches in diameter



(not a broad thin flat one, but one that measures about three-quarters of an inch in breadth and thickness, and is planed smooth), for this we pay sixpence; at the draper's, next door, we get two yards of dairymaid's "cheese-cloth," thirty-six inches wide, for ninepence; and the joiner over-the-way sells us four yards of "sash-line" for twopence. Having secured these our materials, we run home, and borrow one of granny's long darning-needles and some strong whitybrown thread; we spread out the cheese-cloth on the table, then fold it in the middle, so as to bring the two ends together, and then sew up the sides, remembering to stitch these side-seams on the *outside*. Now we have got a bag of an open-meshed material, something like bunting, a yard deep and a yard wide, with no seam at the bottom, and consequently with no fear of stitches giving way when the strain comes, and with no ridges, and puckers, and fag-ends at the sides to entangle and hide the frail tiny things we hope to catch in it. We place the hoop outside the mouth of the bag, turn the edges of the latter well over and under it, so as to cover it completely, and sew it close and tight all round, so that the bag may hang free from the lower inner edge of the hoop. We cut the sash-line in two, we lay the two pieces evenly side by side, and taking them both together exactly in the centre, and letting the four ends hang down, we make an over-hand knot of all parts, five inches below the bend, which gives us a loop, or rather two precisely equal loops, above the one knot; the four pendent ends we put through four little holes in the bag, placed accurately at equal distances from each other, close up under the hoop, and passing the ends from in out, we bring them up over the outside of the hoop, and secure each one to its own part by a double hitch, and there is an end of the job. If we have done our work at all deftly, the hoop will be exactly horizontal and evenly balanced, the bag hanging straight when we hold out our home-made contrivance by the top loops at arm's length, and we shall have provided ourselves with a first-rate net for our purpose, of the largest convenient dimensions, all for the sum of seventeen-pence.

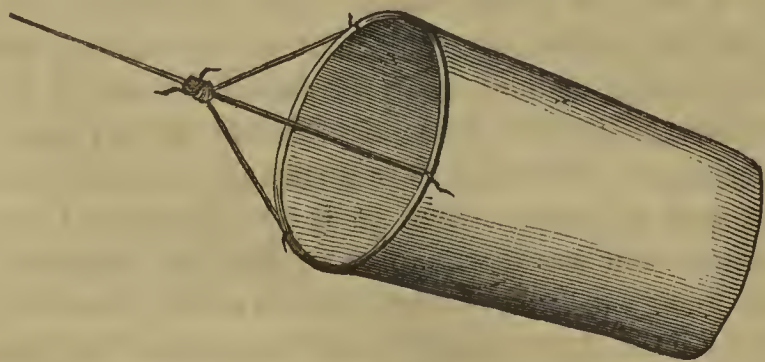


Fig. 175. The home-made Towing-net.

As we intend to make our first essay within half a mile of the beach, and not far from the harbour's

mouth, and prefer that our inaugural haul should not consist chiefly of old corks, cabbage-leaves, shavings, dead cats, and other unsavoury items from ships and sewers, we studiously avoid the hours of the ebb, and as we know that there are comparatively but few things to be found near the surface during daylight, whereas a very world of life wakes up with the bats and owls, and rises from the gloomy depths to revel beneath the pale stars; we consult the almanack, and select an evening when there will be but little moonlight, and the tide sweeping in from the pure open sea, laden with deep-water creatures, will have risen to about "three-quarters flood," one hour after sunset.

Before we set out we take care to have a spare aquarium or a good-sized earthenware footpan filled with clean salt-water, ready to receive the living things we hope to bring back; two or three common gardener's bell glasses, professionally styled "propagators," fitted with wooden stands to act as small aquariums, are also very useful for keeping the things separate after they have been sorted out. They can be purchased, glasses and stands complete, for about eighteen-pence at almost any plumber's or glass-dealer's shop. Ours were procured at Mr. Walker's, 125, Queen Street, Portsea. Arrayed in our oldest clothes, and provided with cloaks to wear in the boat, for in this chilly England of ours it is cold on the water after sundown, even in the dog-days, we repair to the appointed trysting-place, taking with us in addition to the net, a stable lantern, some candle-ends and matches, the largest common washing basin we can find, half a dozen wide-mouthed pickle-bottles that have been well scalded out, a kitchen table-spoon, and a rough towel to dry our hands upon. Our trusty *Palinurus*, William Lambeth, waterman, of 15, King Street, Gosport, is waiting for us with his son and his boat on the beach; it is a glorious evening for our sport, calm and still; there is not a ripple on the dark waters, which look as black as Erebus beneath the sombre canopy of Night.

The blades of our oars light up ten thousand times ten thousand phosphorescent lamps, and the trail left by the keel in our wake is one gleaming furrow of pale ghostly unearthly-looking flame.

We bend the end of the main sheet on to the loops of our net, and as soon as we are well out in the tideway we put the boat's head against the stream and drop the net quietly overboard, giving it about ten feet scope astern, bidding our oarsmen pull steadily, so that the water shall pass through the net at the rate of three knots an hour, a speed just sufficient to keep about half the hoop above the surface, and to prevent the larger captives from making their escape; a greater speed would drown many of the things caught, and wash the more delicate and fragile into "immortal smash." We know for certain that we shall catch a large assortment of the



smaller *Acalephæ*; so while the boat glides smoothly on, let us take a brief glance at what Professor Owen and others have told us about them, so that when we have taken them we may not simply admire them in ignorant wonder as curious objects, but may have some slight general idea of their economy, their life history, and their place in Nature. Ignorance will ever cry *Cui bono?* Superstition will cry Beware! beware of the tree of knowledge! beware of the pursuit of truth! forgetting how men of old were condemned because they loved darkness rather than light. Good, pious, well-meaning dunces, listen to the words of one who was at least equal to you in all goodness, and immeasurably superior to you in wisdom and intelligence. "There is no danger to profound these mysteries, no *sanctum sanctorum* in philosophy: the world was made to be inhabited by beasts, but studied and contemplated by man: 'tis the debt of reason we owe to God, and the homage we pay for not being beasts. The wisdom of God receives small honour from these vulgar heads that rudely stare about, and with gross rusticity admire his works; those highly magnify Him, whose judicious inquiry into his acts, and deliberate research into his creatures, return the duty of a devout and learned admiration." —*Religio Medici*, A.D. 1686.

"The *Acalephæ* are remarkable on account of the peculiar nature of their tissues, which are often as transparent as the purest crystal, and seem more like the vitreous humour than any other in the higher classes; they are not less interesting for the elegance of their forms, the beauty of their colours, and for the peculiar property which many of them possess of stinging and inflaming the hand that touches them; whence the term *ἀκαλήφη*, applied to them by the ancient Greek naturalists, and "sea-nettles" by our fishermen and sailors. They are represented on our own coasts by numerous discoid and spheroid species, varying in size from an almost invisible speck to a yard in diameter, and which, besides the vernacular name above cited, are known as "sea-blubbers," "jelly-fish," or by the Linnæan generic term "*Medusa*." This class has been divided into *Physogrades* (*φύσιγξ*, a bubble, and *gradior*, I proceed), floating by means of air-bladders, like the familiar Portuguese Man-of-war; *Ciliogrades*, which propel themselves by the action of their external cilia; and *Pulmogrades* (lung-walkers), which swim by the contractions of the umbrella-shaped respiratory disc; the common *Rhizostoma Cuvieri* for example. The terms *Siphonophora*, *Ctenophora*, and *Discophora*, are substituted by some authors for those given above.

Our young friends are probably familiar with that commonest of polyps, the *Hydra viridis*, which is to be found hanging down from the under side of the floating duckweed on every pond, and they know how it catches its living prey with its snaky

arms, and multiplies by gemmation almost like a plant. Now, the lower forms of our *Acalephæ* are very closely related to the humble polyps; indeed, the lowest *Medusa* is little else than a *Hydra* with an umbrella. Here (fig. 176) is one of them, which will serve to show the general plan of construction of the Naked-eyed Medusæ better than any lengthy description.

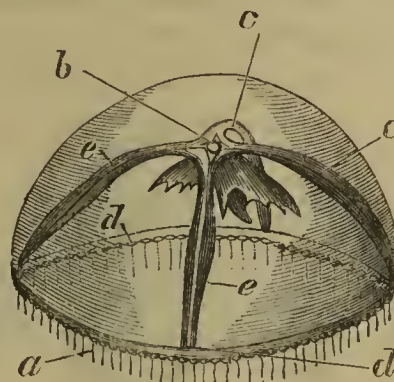


Fig. 176. *Thaumantias Pilosella*.

In fig. 176 (a) shows the buccal arms, or oral tentacles forming the lips; (b) the stomach. An œsophagus leads from the mouth to this gastric cavity, which is altogether an improvement upon the mere bag of the hydra. From its upper end four gastro-vascular canals (c) radiate towards the margin of the disc, and communicate with the circular marginal canal (d), which carries the nutrient fluid right round the body. On either side of the radiating canals are placed the ovaries (e); and certain excrementitious orifices, first discovered by Ehrenberg, are situated at equal distances on the margin of the disc. "In the higher animals we are accustomed to find the nutritive apparatus composed of several distinct systems, one set of organs being destined to the prehension of food, another to digestion, a third to the absorption of the nutritious parts of the aliment, a fourth provided for its distribution to every part of the body, and a fifth destined to insure a constant exposure of the circulating fluid to atmospherical influence. These vital operations are carried on in vessels specially appropriated to each; but, in the class of animals of which we are now speaking, we find but a single ramified cavity appropriated to the performance of all these functions, and exhibiting, in the greatest possible simplicity, a rough outline, as it were, of systems afterwards to be more fully developed."

Ten minutes have elapsed since the net was "hove," so we light the lantern, put about a pint of salt-water into the basin, and, in the midst of a breathless silence, we draw in our line, and carefully lift our frail apparatus over the gunwale, and deposit it on the bottom-boards. All eyes are riveted upon it, and some one is rather shy of it, turns a little pale, and evidently thinks it the least bit "uncanny;" pale blue, deathly-looking flames, like the baleful corpse-lights Mrs. Crowe used to find flickering round the fearful old churchyards



she tells us about in her "Night Side of Nature," are playing all over it; but these little fireballs that flash and wane, and flash again, and these still more ghostly lights that seem to smoulder and creep, are no evil portents, "warnings" from the unseen world, unhallowed envoys from the charnel-house, or from the ancient mariners who lie drowned deep down beneath us in Davy Jones's locker, but lovely little *Cydippes*, and exquisite little ocean-fairies, as we shall see by-and-by.

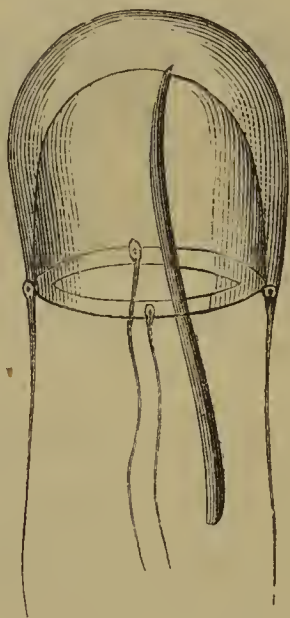


Fig. 177. *Sarsia tubulosa*,  $\times 2$ .

Carefully turning the net inside out over the basin of water, the larger captives fall into it with tiny splashes, while the small fry which cling to the meshes, and get into the corners, must be patiently brushed and swept off; it is even as well to rinse the net itself in another vessel of water, to make sure of securing the scores of larvæ, crustaceans, and tiny microscopic things that are certainly there. And now let us cast the net again, and look over this our first "take." Shooting to and fro in the water is a translucent bell-shaped Medusa (fig. 177); it has four marginal tentacles arising from four bulbs or tubercles, each bearing a little dark *ocellus*, or eye-spot; and hanging from the interior of the crown of the sub-umbrella, is a remarkable appendage which reminds us something of the tail of a kite; it is one of the *Sarsiadæ*, a genus named after the Norwegian naturalist Sars. The long, blue, pendent kite-tail, which is really a "probosciform peduncle," a kind of proboscis with a mouth at the end, and containing the stomach, tells us at a glance that it is *Sarsia tubulosa*, a species very plentiful in the Solent, and which may be kept alive in confinement for a fortnight without any trouble.

Beginners first venturing to "fish for themselves" in the great ocean of facts, or in that very deep well at the bottom of which Truth lies hidden, will often be amazed at catching in shoals, all manner of things which are declared to exist only in the South Seas, or at the North Pole, in the Persian Gulf, or the Sea of Ohkotsk; every day almost they will find

such "distinguished foreigners" turning up by the dozen on our own unromantic shores. Here, for instance (fig. 178), is a brilliant brightly-coloured specimen of *Turris digitalis*, supposed to belong of right to the same latitudes as the seal and the walrus, which we have now taken within fifty yards of a family bathing-machine on our own prosaic beach, in sight of the windows of the Pier Hotel.



Fig. 178. *Turris digitalis*,  $\times 3$ .

The next we find is a *Thaumantias*, a member of a very abundant family. "Of all the Naked-eyed Medusæ, those belonging to this genus are most common in our seas, swarming in countless myriads in our bays and harbours. They are among the most usual causes of phosphorescence." Their generic characteristics are thus defined:—"Umbrella hemispherical, in some species almost globular, in others much depressed; ovaries four, varying in form from ovate to linear, conspicuous on the sub-umbrella in the course of four simple radiating vessels; margin of umbrella with tentacula in variable numbers (from 4 to 200) according to the species, their bulbs always ocellated; stomach sessile, dependent from, and almost always included within, the sub-umbrella; mouth with four lips, rarely fimbriated."



Fig. 179. *Thaumantias cymbaloidea*.

The action of the cilia and the motion of the nutrient fluid in the gastro-vascular canals of the Medusæ is beautifully shown by the microscope; the auditory and visual organs are equally wonderful and attractive. For full details of the mechanism and habits of these strange inhabitants of the great waters, we must refer to Professor Edward Forbes's



work, "The British naked-eyed Medusæ," from which we borrow a drawing and a few particulars for the benefit of those who cannot possibly refer to the work itself.

"At the base of the marginal tentacula there are present in a great many of these animals coloured spots or bulbs; in some species these points are very strongly coloured, and from their magnitude indicate the course of the animal when in motion, appearing like a circle of gems in the water. When these bulbs are examined under the microscope, we find their organization more complicated than at first glance it would seem to be. In the majority of species, perhaps in all, these bulbs, whether conspicuous from colouring or not, contain a small cavity quite distinct from any coloured spot which may be present. The former is the *otolitic vesicle*, the latter the *ocellus*." The otolitic vesicle, which, from analogy and its peculiar structure, is considered an organ of hearing, is a small spherical sac developed in the midst of the granular substance of the bulb, and containing more or fewer vibrating bodies: these vibrating crystals or *otolites* have been distinctly seen in motion, and chemical tests have shown them to be calcareous. The *ocelli*, from analogy, are regarded as rudimentary eyes, or rather, light-perceiving organs: they vary greatly both in colour and complexity of construction. "That these bodies are the eye-spots, there can be no doubt, when we compare them with similar bodies in the higher Medusæ." In them crystals are present, which have been shown by Rosenthal to be *silicious*, a character by which they are strikingly distinguished from otolitic crystals, which are always *calcareous*.

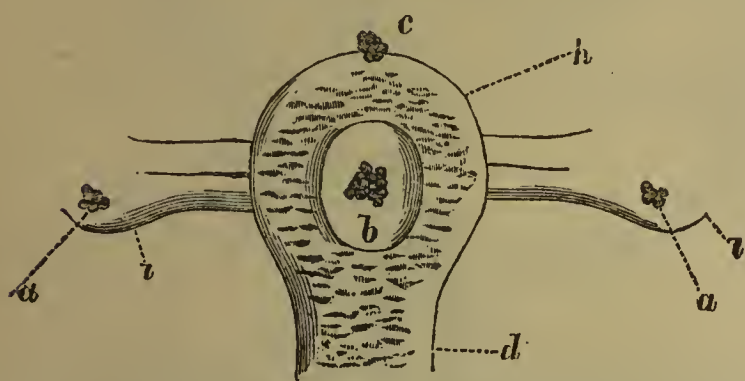


Fig. 180. Marginal bulb, with ocelli and otolites of *Oceania turrita*  $\times 25$ , after Forbes.

In fig. 180, *d* marks the upper end of the tentacle immediately below the bulb, which contains (*b*) the otolitic vesicle with its included crystals; *c*, the crimson ocellus; *i*, marginal bulbs bearing the rudimentary ocelli (*a*).

Of all the exquisitely beautiful things that frequent our seas none can surpass our fair *Cydippe*, one of the *Ciliograde acalephæ*. If we had time, we should go into raptures about the crystal globe, the eight costal bands of cilia, the long retractile tentacles, and a dozen other things; we can only remark that the learned have had a grand dispute

about the situation of her mouth. Reasoning from analogy, one might expect that the mouth would be situated between the tentacles at the lower pole of the globe; but Nature has thought proper to place the "buccal orifice" at the upper, and not at the lower extremity. The oldest drawing published shows the mouth at the wrong end, and, as is the case with natural history illustrations in general, this poor old plate has been sedulously copied, blunders and all, into almost every book in which *Cydippe* has been mentioned, for the last forty years.

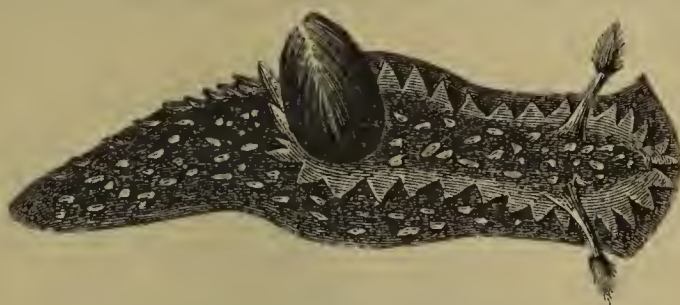


Fig. 181. *Cydippe pileus*.

Although we had seen *Cydippe* swallow coloured objects by the upper orifice, and eject refuse matter by the lower one, we might still have yielded to the dictum of "the authorities," had we not come across the positive declaration of Owen, that the mouth of our heroine is at the upper pole of the globe, while the cloacal canal terminates in two small excretory ducts at the other extremity.

This shrimp-like fellow, half an inch in length, of a brilliant crimson hue, mottled with spots and patches of white, is *Amphithoe rubricata*, a natatory amphipod of the nest-building order.

We are chiefly indebted to Mr. Spence Bate for our knowledge of the habits of the curious crustaceans who construct abodes in which they take shelter and bring up their families. Writing of our *Amphithoe*, he says: "This animal generally lives in a nest of its own construction. Its common resting-place is at the roots of *Laminariæ* and other plants, or on the under sides of stones, at the bottom of the sea in a few fathoms of water, seeking some secure nook or quiet corner in which to dwell in peace and safety. Some specimens which we kept alive, built for themselves nests against the surface of the glass vessel in which they were confined. On the side of the vessel grew young fronds of weed; each position which was selected by one of the animals for its abode was swept clean for a distance round the nest by the long antennæ, proving distinctly that the animal reaches out and collects material to assist in the construction of its cell. Upon placing one of these newly-constructed dwelling-places under the microscope, we found that the many bits of weed, chiefly green ulva, were matted together by some exquisitely delicate fibres. This fibrous material possessed the appearance of having been spun or twisted, since frequently small loops were formed by a fibre having been twisted upon itself.



We have not been able to discover whether this thread-like web be excreted by the mouth, or whether or not there be an especial organ for its production."

The fact that animals, more or less like the prawns and shrimps hawked about from door to door, build nests like birds in the branches of the trees of the ocean forests, is so curious that, for the sake, not only of our young readers, but for the benefit of some of the big children also, we venture to reproduce (fig. 182) one of the charming vignettes of the noble work on the sessile-eyed crustacea by Bate & Westwood.



Fig. 182. Group of nests of *Podocerus capillatus*, after Bate and Westwood.

Here is another crustacean, a stalk-eyed Stomopod of the family *Mysidæ*; and by the remarkable "flippers" of his tail, we recognize him at a glance as *Mysis Chamæleon*. The colours of this genus are very variable; probably they are affected by the prevailing colours about the habitat of the individuals; this one is a of greenish grey, and each plate of his armour bears a large stellate mark of a reddish hue. We need not enter upon his generic characteristics, they are to be found in "Bell's Crustacea."

"No distinct branchial apparatus has as yet been observed in this remarkable genus, and, as is observed by Dr. Milne-Edwards, the only appendage which appears to be so modified in structure as to become more adapted than the rest of the body to serve the purposes of a respiratory organ, is the *lash* of the first pair of pedipalps, which in other respects are similar to those found in numerous species possessed of branchiæ; it is, however, not at all improbable that this may be the true organ of respiration." There is another very striking peculiarity of this genus, which, if it has been observed, has not been alluded to in any of the works we have seen; viz., the auditory sacs, or vesicles containing

crystalline *otoconia*, situated near the roots of the lateral laminæ of the tail, as shown in fig. 183,

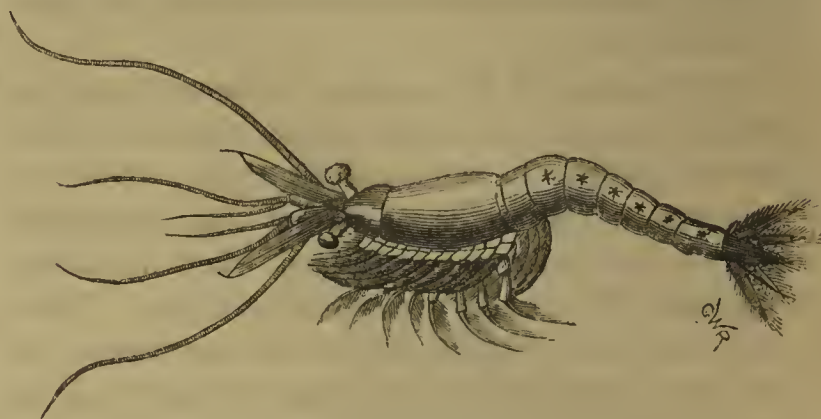


Fig. 183. *Mysis Chamæleon*,  $\times 3$ .



Fig. 183. Tail of *Mysis*, with *otoconia*,  $\times 10$ .

which has been engraved from a slide in our possession, on which the tail of a specimen taken in the net, on the very cruising-ground about which we are now gossiping, is preserved.

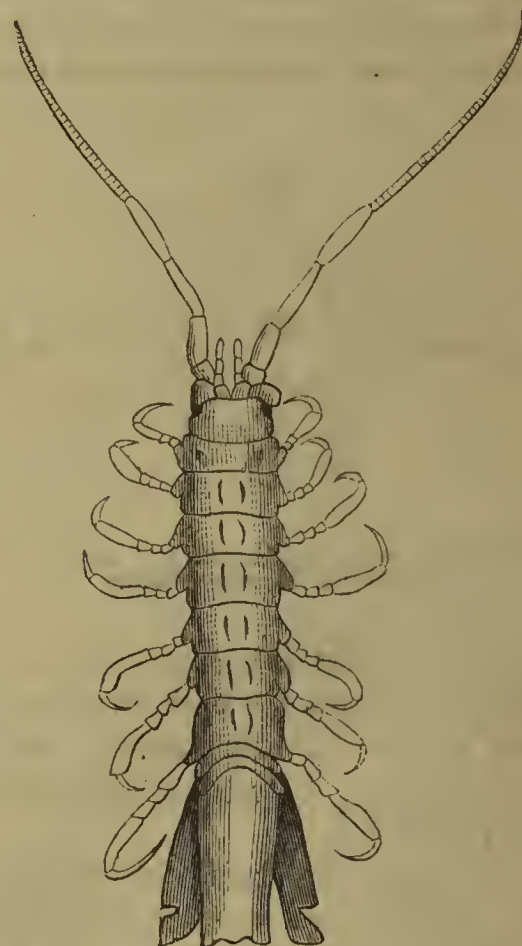


Fig. 184. *Stenosoma lineare*. Nat. size.

This transposition of a sense, the idea of listening with the tail, seems strange; but here is a stranger creature that breathes with his tail. This is an



aberrant Isopod of the family *Idotæa*, the *Stenosoma* of Leach, and the *Idotée linéaire* of Milne-Edwards, and he looks like the marine equivalent of our terrestrial myriapods, although he is only furnished with seven pairs of legs, which are adapted rather for walking than swimming.

"L'abdomen ne porte point d'appendices à son extrémité, mais est garni en dessous d'un appareil operculaire très-développé, destiné à clore une cavité respiratoire où se logent les fausses pates branchiales." It is interesting to watch the rapid fluttering of these opercular valves, and to observe

the fish in the nets." They are much used by the Mediterranean fishermen for bait, who catch them by sinking bundles of *Fucus ericoides*, which, on being hauled up, are found covered with Isopods and Talitri.

We have caught one of those odd things, the *Pycnogons*, commonly called "Sea Spiders," from their apparent outward resemblance to the *Arachnida*. Dr. Anton Dohrn, who has recently written on their embryology, is of opinion that they are true *Crustaceans*. Although they are common enough everywhere, they seem to be still a puzzle

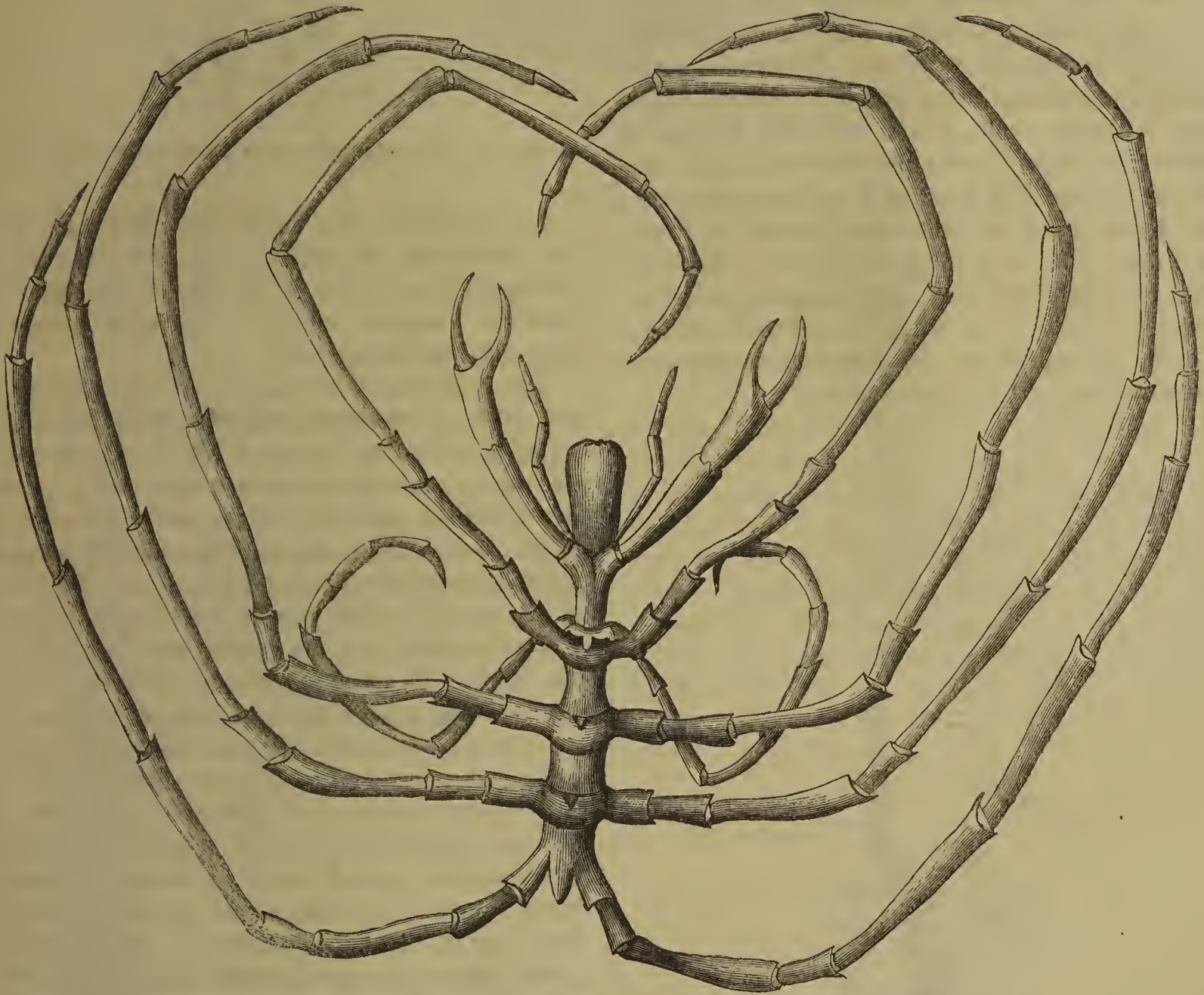


Fig. 185. *Nymphon gracile*,  $\times 10$ . C. Barron, Ad. Nat. Delt.

how their action insures the ceaseless flow of an ever-changing and ever-renewed current of water over the branchial plates. A Monsieur Roux, who has written about the habits of the *Idotæa*, says: "They abound where the sea has brought together masses of algæ in a state of decomposition; here, at a depth of a foot or two in tranquil water, they multiply rapidly, feeding voraciously on dead fishes, mollusks, annelids, and other animal matters, gnawing also the meshes of the nets of the fishermen. They are essentially nocturnal, hiding under marine plants by day, coming forth after dark to feed; sometimes in such vast numbers as to damage

to naturalists. It is said that they live parasitically upon *Cetacea*, and even upon some of the *Medusæ*; but, as far as we can judge, nothing, or next to nothing that is absolutely reliable, is known about them. We find them in abundance under the stones and roots of weeds at low watermark, which we fancy is their natural habitat, where they probably feed and live much after the manner of other small beach-haunting crustaceans. When disturbed or carried away by the tide or the waves, they, like other creatures, will catch hold of anything, from whales to sea-blubbers, that may come in their way. We can only present our readers with a faithful



drawing, a portrait of one of our captives, drawn by an expert; and we shall be glad if any of them can give us an authentic account of the habits and vital economy of this curious family.

A yellowish-brown object the size of a small pea has been found clinging closely to the inside of the bag; it is an odd composite-looking creature (fig. 186); it seems to be made up of parts of three different and wholly incompatible animals. The bulky central portion (the thorax or *περαῖον*) is armour-plated, and of a pale chestnut colour; while the head and tail (*κέφαλον* and *πλέον*) are opaque white. The first might belong to some terrestrial winged insect; while the last is the typically perfect *οὐρά* of a marine crustacean. After much discussion, an adept pronounces it to be a *Praniza*, or rather the fully-developed larval form of a creature which, after another moult, would be called *Praniza* by those who follow Leach; but recent researches seem to have proved that *Praniza* is not a distinct genus or species, but is only the adult form of the female of *Anceus*. The sexes are so wholly unlike each other that for a long time they were described as distinct species. "The *Anceus* of Risso, and the *Praniza* of Leach, are respectively the adult male and the adult female of one and the same species."

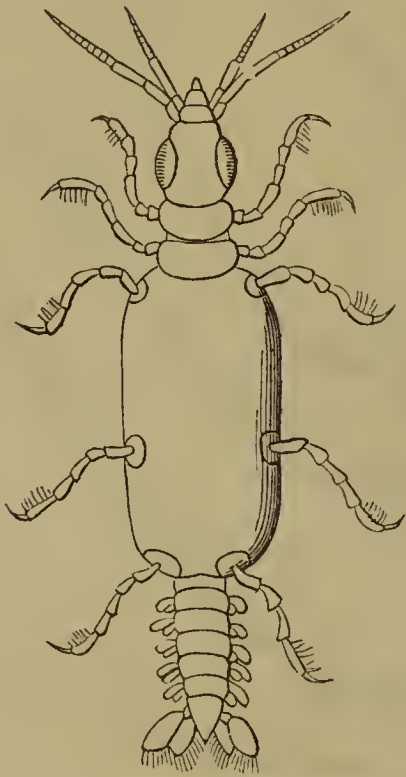


Fig. 186. *Praniza* (fully-developed larva),  $\times 10$ .

*Anceus* is a genus of the *Isopoda*. The perseverance, conscientiousness, and determination with which our leading naturalists follow up and unravel the tangled mazes of the life history of the meanest of living things, is well exemplified in the elaborate chapter upon this genus in the work on the "Sessile-eyed Crustacea," before referred to. In their early stages both sexes are furnished with suckorial mouths; "the females live parasitically upon fish, burying their heads almost up to the eyes; and we repeat that we believe that up to the same period

the male does also; but with the adult moult the female quits the parasitic life for a new kind of existence. With the adult moult the male gets rid of the lanceolate oral appendages, and large projecting mandibles are developed. The oral appendages of the female also undergo a great change: as in the male, the lanceolate organs of the mouth are lost; but, unlike the male, they are replaced by no other appendages."

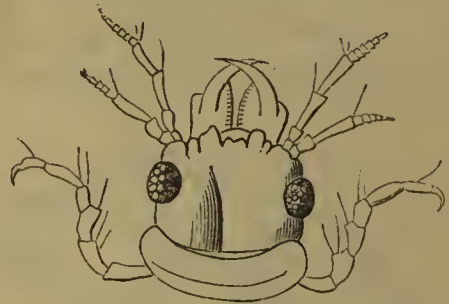


Fig. 187. Head of adult male of *Anceus maxillaris*,  $\times 20$ .

Fig. 187 displays the head of the adult male, with its formidable mandibles; fig. 186, the fully-developed larval form of the female, the creature which we ourselves caught. The adult female is very different in appearance.

This cold, shapeless lump of dark quivering jelly, not unlike a ripe grape saturated with water and stripped of its skin, and not at all pleasant to touch, undergoes a pleasing transformation when placed in a bell-glass with some of its native element; it swells and expands, and stretches until it becomes a gorgeous mollusc of emerald green,—a *Nudibranch*, of the family *Doridæ*, wearing his plumose lungs in a coronal wreath on the hinder part of his broad, flat back; his curiously-formed tentacles are far back on his neck, with eye-specks at their roots; his skin is covered with vibratile cilia, and is full of calcareous spicules; he is all over little horns; he is the *Polycera Lessonii* of D'Orbigny. No doubt he has just risen from his calm retreat amongst the rocks under a tangled forest of *Laminaria*, after a heavy supper of zoophytes and sponges, with perhaps a bit of "dead man's thumb," *Alcyonium digitatum*, by way of a finish, to take his evening stroll at the top of the water, walking upon it, or rather, just underneath it, with his back downwards, and the expanded sole of his one flat foot turned up to the veiled sky; or he may have finished his after-supper mile, and have been taking a comfortable snooze, suspended from the surface by the tip end of his tail (which he had previously buoyed by throwing out a horizontal film of mucus), and hanging head downwards, regardless of apoplexy. Members of his family are often to be found under shelves of rock at dead low water; but they look like anything but living things, and are generally passed by with perhaps the remark, "Those must be the eggs of something or another." They have the power of producing a very curious sound, a kind



of metallic clink, which astonishes us the first time we hear it proceeding from our aquarium.

amination we find to be "rounded eminences belonging to the cellular epidermis, and from which



Fig. 188. *Polycera Lessonii*,  $\times 3$ . C. Barron, Ad. Nat. Delt.

These very transparent and all but invisible things, which we can only see shooting about when the light falls upon them, and which then look very much like those little glass tubes which ladies call "bugles," and use in trimming bonnets and dresses, are *Sagittæ*. There has been some discussion respecting their affinities; they have been classed with the marine annelids; but of late they have been placed amongst the *Articulata*.

"The body of *Sagitta bipunctata* is divided into three distinct portions,—the head, the trunk, and the caudal portion, which are separated from each other by transverse septa. Posteriorly, the body is furnished on the sides and extremity with fine delicate membranous expansions, which have received the name of fins, though bearing no analogy with the fins of a fish. The caudal fin is quite distinct; it is broad and somewhat rounded, expanding like a fan from the posterior extremity of the body, and passing a short distance upon each side." The

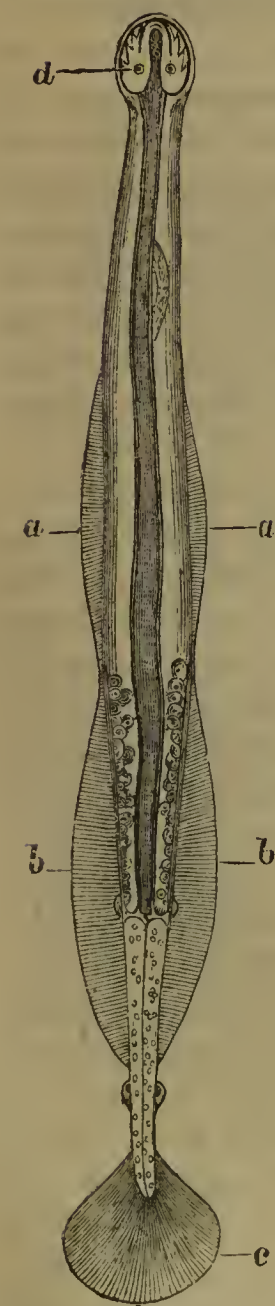


Fig. 189. *S. bipunctata*, dorsal aspect,  $\times 10$ .

integument displays numerous distinct whitish well-defined spots, which on ex-

project minute bundles of excessively delicate rigid filaments or setæ." The head is distinctly separate from the trunk, and is surrounded by a sort of membranous hood, which is capable of being drawn backwards over it. On each side a series of curved pointed hooks (fig. 190, *c*), which, when the hood is expanded, close from either side of the mouth. Besides these large buccal hooks, there will be observed at the anterior extremity of the head two curved series of smaller denticles (fig. 190, *a*), one behind the other on either side.

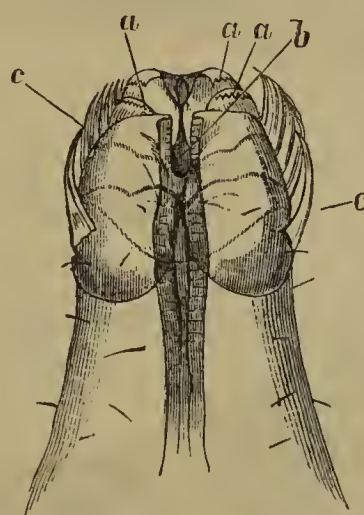


Fig. 190. Head of ditto, ventral aspect,  $\times 25$ .

Unfortunately, the whole of our specimens of this genus caught on our preceding excursion died, and we have thus been prevented from introducing an original drawing from nature, which we had calculated upon; but we have been fortunate in finding a thoroughly reliable drawing in *The Journal of Microscopical Science*, vol. iv., 1856, which fully answers our purpose of enabling the novice to



identify the animal if he catches one. As in the case of *Nymphon*, little or nothing appears to be known about them; they are very numerous on our coasts, and seem to be found all over the world.

In fig. 189, *a a* denote the anterior lateral fins; *b b*, the posterior lateral fins; *c*, the caudal fin; *d*, the eye-spots. In fig. 190, *a* denotes the oral denticles; *b*, the mouth; *c*, the hooks.

Last of all we notice a little eel-like thing, *Syngnathus ophidion*—the Straight-nosed Pipe-fish. Smaller than most of his allies, he is easily distinguished from all by the straightness of his nose, and by the tip end of his tail being smooth and round, and destitute of a caudal fin. The smallest of all the British species is *S. lumbriciformis*, the Worm Pipe-fish, which is comparatively rare; like *S. ophidion*, his tail is smooth and finless; but he has a little pug nose, which is bent up in the air like the nose of a King Charles's spaniel.

The other British species are: *S. Acus*, the Great Pipe-fish; *S. Typhle*, the Deep-nosed Pipe-fish; *S. æquoreus*, and *S. anguineus*, whose heads and tails are given for identification.



Fig. 191. *Syngnathus Acus*, nat. size.



Fig. 192. *Syngnathus Typhle*, nat. size.



Fig. 193. *Syngnathus æquoreus*, nat. size.

We once kept *S. ophidion* for three months in an aquarium; he was particularly remarkable for perpetually getting himself swallowed by the large anemones. Whether his skin was too tough, or he didn't agree with them, we cannot say; but they

invariably "rejected" him after a few minutes, and at last they ceased to pull him in, when his tail, which hung dangling down, dragged across their tentacles.

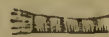


Fig. 194. *Syngnathus anguineus*, nat. size.

We have trespassed largely upon the limited space afforded by the pages of this publication; but we have only been able to draw attention to a few of the many creatures that are certain to be caught within the short space of one hour. There are swarms of *Cypridæ* and other *entomostracans*, and larval forms of *crustaceans* without end.

Perhaps some of our friends who are now rushing off to the seaside may think it worth their while to skim the surface of the blue water after sunset, and to try what they can catch with a home-made towing-net.

Bury Cross, Gosport.

## FLORAL FINDINGS—SEPTEMBER.

"Far and wide—  
Nature is smiling in her loveliness."

STREET

SEPTEMBER will have arrived in all its autumnal beauty before these jottings are seen in print, consequently I trust that, although I do pen them a few days in advance, I shall not be so severely taken to task for the heading I have selected, as I was when my last "Floral Findings" unfortunately appeared in mid-winter.

Every true lover of the country must acknowledge the charm of September scenery; there is so much to be studied and admired in this month: the ever-changing foliage of the woods and hedgerows, the wondrous skies, the golden cornfields, merry reapers and busy gleaners, all attract us in turn.

Have you ever noticed how softly the haze of a September morning seems to blend in with the entire landscape, or how strongly the rays of a bright September sun throw out every feature in the scene, whether it be ruined castle or ivy-mantled spire, tumble-down mill or fine old oak "hanger," russet-coloured fern-bank or heath-covered moor? There is one dear, loved spot in South Wales, a wild mountain waste, from whose summit six counties are visible, always carpeted with the purple ling bloom during the month of September, and there, evening after evening in the days gone by, I used to ride and watch the setting sun, my "fanciful imagination" almost picturing heaven, with its "gates ajar," behind those glorious broken



masses of ruby and gold-lined clouds which hang in the western sky.

My pony was a quiet one. It would stand patiently while I gathered, on my homeward route through the narrow, rugged lanes, large numbers of the scarlet "heps," or "hips," as the fruit of the wild dogrose (*Rosa canina*) is called, or made my teeth black, and stained my riding gloves with the juice of the brambleberry (*Rubus fruticosus*), and graze with its bridle thrown over its neck, while I captured some of the winged seeds which flew through the air like big spiders, or filled my handkerchief with the sloe-berry and crab-apple.

This was in the happy time of girlhood, when to watch the squirrel catering for his winter hoard, or follow the swallow in its winged flight, was sufficient enjoyment; when sheep-shearing was an event, and harvest-home a pleasure. But although these feelings may belong to the past now, their memory lingers still, and I would fain describe for the amusement of those who are not able to visit the country in autumn, some of the things to be seen there during the month of September.

I have mentioned the dogrose; few, perhaps, are practically acquainted with the good qualities of this flower. I am not going to award it the repute Pliny did, and affirm that its root will cure the bite of a mad dog; but its petals when dried make a very good tea, and if distilled when freshly gathered, they afford a delicious perfume. The fruit is used on the Continent as an ingredient in different sauces, and the Russians of the Volga prepare a spirit from its flowers. Have you ever noticed the pretty little bright green ball found on this shrub? It is made by an insect, and was called *Bedeguar* in old medical works. If you cut open these excrescences, you will find either the eggs or larvæ of *Cynips rosæ*.

The oak-gall is likewise produced by the puncture of an insect. I am not alluding now to the true oak-gall of commerce, though that has the same origin, only the little instrument is a different insect to the one that makes our oak-apples. By the way, will any of the readers of SCIENCE-GOSSIP kindly tell me what the insect is that eats the kernel of the wild nut—the wood nut? The grub lets itself down by a thread, which it spins after making its way out of the shell; but I have never met any one who could say they had seen the *perfect insect*.

I like the blackthorn for the sake of its pretty white flowers, which appear in spring before the leaves come out, more than I do on account of its fruit, although its dark purple fringe, covered with bloom like a plum, always possessed a charm for me in September, especially after the first frosts had aided to mellow it. The Welsh have an idea that the puncture of a blackthorn spine is poisonous, and I certainly have seen very ugly symptoms follow the scratch made by some of the branches of a well-spined tree in a raid after berries.

Now, although September is decidedly more Pomona's month than Flora's, fruits and berries being in the ascendant, yet there are still some flowers left—wild flowers I mean; for with the Crystal Palace grounds before my eyes as I write, glowing in the brilliant loveliness of crimson geraniums and yellow calceolarias, many-hued foliage plants and stately hollyhocks, I could not possibly say there are but few flowers in September.

The Mallow is one of this month's favourites. Few of us who have spent a childhood in the country but what remember the little "cheeses" we used to play with—the curious fruit of the Common Mallow (*Malva sylvestris*). This species has large purple flowers, but the bloom of the Marsh Mallow is a light rose-colour, and we find the plant most abundantly on the seashore.

Another seashore September "floral finding" of mine was the Sea-holly (*Eryngium*), with its exquisite greyish-green leaves, and light purplish-blue flowers. I think it is one of the most elegant wild flowers I know: I found it on the Pembrey sand-hills this time last year, and had considerable difficulty in persuading some Cockney friends, to whom I showed a few specimens on my return to town, that the glaucous, ribbed, veiny, spined leaves were not artificial. Were it not for these same spines what a lovely decoration it would make for a headdress. I placed a branch in a black lace bonnet, and I assure you the effect was charming (when the bonnet was in the hand). Sea-hulner and sea-holm are provincial names given to the Eryngo.

Then we have all the thistles; they bloom late.

"Proud thistle! Emblem dear to Scotland's sons."

Which of all the species of thistle is the true Scotch one? I am told that the "Milk Thistle," usually said to be the Scotch emblem, is very far from common in that country, but that the "Welled Thistle," which is much more abundant on both Highland banks and Lowland wastes, is better entitled to the honour. The white veins on the leaves were, all good Catholics will tell you, produced by a drop of the Virgin's milk falling on the foliage; but we have an *heretical* variety, in which the milky veins are wanting.

The genus *Senecis* add largely to our September wild flowers. These are all the Ragworts; bright yellow blossoms some of them have, despite their mean-looking leaves.

The Meadow-sweet, with its elm-like form and leaves, decks our moist fields and banks in this month, spreading its hawthorn-like odour in every direction. Some of the foreign names of this plant signify goatsbeard, "*Geiten baard*," and "*Barba capræ floribus compactis*."

I understand that the Greeks flavour some of their wines with the blossoms; and certainly, if you steep



them in mead, it gives that drink a very agreeable aroma and taste. "Mead-sweet" is one of its provincial names. I wonder if this refers to land on which the flower grows, or to its ancient use in mead-making?

The Toad-flax is a flower I gather in September,—the "butter and eggs" of childhood's "floral findings." It seems to me there are more yellow blossoms in autumn than in any other season of the year, from the Golden Rod and Great Mullein down to the Tansy.

Upper Norwood.

HELEN E. WATNEY.

### MACROTHRIX.

By EDWIN SMITH, M.A.

I FOUND, in July last, a good many examples of this curious little entomostracan in the so-called "Black Water," a shallow pool on the turf



Fig. 195. Macrothrix magnified.

soil of Lindow Common, near Wilmslow, Cheshire.

It belongs to the family of the Daphniadæ, and bears a close general resemblance to an ordinary Daphnia. My specimens corresponded in their leading characters to the description of *Macrothrix laticornis* given by Baird in his British Entomostraca. Thus, referring to the figure drawn from an average specimen of my capture, we observe that the superior antennæ are flat, and hang by a joint from the prominent beak. At their free extremity, which is broad and straight-edged, I noticed three minute and three larger bristles or spines. The inferior antennæ are of considerable size, and divide into two branches. The posterior branch has three terminal feathered setæ or bristles, and a short spine at their base. A second short spine occurs at the end of the first joint. Baird mentions four setæ on this particular branch; three in the position stated, and another from the end of the second joint. But I could not detect this fourth seta with the most careful search on any of my specimens. I have therefore not drawn it. The anterior branch of the inferior antennæ is armed with five setæ, three terminal feathered ones accompanied by a small spine at their base, one at the end of the second joint, and a third much longer than the rest serrated with minute spines at the end of the first joint, also having a minute spine at their base. Each seta is itself jointed about the middle, and it is only the outer tapering segment which is feathered or distinctly spinous. The creature has, moreover, a large compound eye, in front of which is situated an oblong black spot. The intestine is strongly bent into three deep curves, but is not convoluted. The last segment of the body has two hooked spines at its extremity, and a pair of long bristles further back at an angle of the segment in question. The carapace is oblong, somewhat blunt behind, and armed on its anterior margin with long bristles. Its surface, in my specimens, was distinctly dotted. Its general form was longer in proportion to the breadth than Baird's figure of *Macrothrix laticornis* (tab. xv. 2). Can I have lit upon a new variety? The absence of the fourth seta on the posterior branch of the inferior antennæ is also noteworthy, as another point of difference from Baird's description.

While comparing my completed drawing with the original contained in the live-box, what was my astonishment to observe some of the parts suddenly become double! There first appeared a double hinder segment, with a double set of hooked spines. Then a double beak and double superior antennæ showed themselves. Then other parts were doubled in like manner; and it became evident that I was the fortunate witness of the moulting-process, if that is the correct term. The little creature was "shuffling off its mortal coil," in preparation for a new stage of growth. I immediately mounted my interesting friend in glycerine, hoping



to catch and fix the process half completed. But, alas, I was not quick enough. My *Macrothrix* lies side by side with its cast-off exuviae. Will the editor, or one of his accomplished readers, kindly inform me whether my capture is really a novelty or not?

## THE STORY OF A PIECE OF SLATE.

By J. E. TAYLOR.

I WAS not always what you now see me. Far, far back in that almost infinite past, which geology claims before it can explain its phenomena, I was lying along the bottom of a tolerably shallow sea, as part of an extended sheet of fine mud. My birthplace is registered in the heart of the North Welsh mountains, and the formation to which I belong goes by the name of the Cambrian.

Its rocks form some of the grandest scenery in the world. Steep precipices, on which grow rare ferns and wild plants, frequently too tempting to the botanical student, are the result of succeeding dislocations, jointings, and bedding. Mountain streams brawl over them; and waterfalls, whose substance is evaporated into prismatic mists, pitch from the summits of these Cambrian hills. Frequently the rocks are so hard and bare, that even the lichen and moss fail to obtain foothold, and so the naked slate shines in the varying sunlight in coloured shades from pink to deep blue. Here, with the gathering cumuli ring-like crowning their peaks, the Welsh hills stand forth in all their characteristic grandeur. No wonder that crowds of tourists should strive to forget the cares of business, and endeavour to get a mouthful of purer air, whilst climbing their steep sides!

It requires some faith in geology to carry the mind definitely backwards to the time when these rugged hills were extended sheets of marine mud! But no mathematical deduction is more certain. You never find clay or sandstone rocks so full of fossils as limestones, for the simple reason that the former are of *mechanical* origin, and the occurrence of organic remains is therefore accidental. Whereas limestones are of *vital* origin, resulting from organic agencies almost entirely.

You examine the slate rocks of which I am a humble representative. Their colour and general texture you easily recognize from the too familiar appearance of the London housetops. But, when in position, you are scarcely prepared to find that what you had imagined to be the result of bedding or lamination in the slates is actually due to what is termed *cleavage*. This is a peculiar feature about thin-bedded argillaceous or clayey rocks, that they undergo, when subjected to pressure, and perhaps heat as well, a certain change, which is in reality a sort of rude, massive crystallization. By virtue

of this process, the rock splits not so readily along the lines of stratification or bedding as along that of the cleavage, or planes of sub-crystallization.

In addition to this structure, which is frequently diagonally across the line of stratification, these slate rocks are broken up into large cubic masses, caused by great joints traversing the rocks, irrespective of any previous alterations.

The stratification itself is not horizontal, but frequently pitched up at a very steep angle, and commonly the rocks are contorted into a series of ribbon-like convolutions. After all this cleavage, jointing, dislocation, and faulting, the solid rocks have been subjected to thousands of centuries of atmospheric and marine wear-and-tear! Can it be wondered at, therefore, that there should result from all these combined agencies, continued through untold millenniums, all that wildness and grandeur of physical scenery which distinguish these old Cambrian rocks wherever they are met with?

These old rocks, especially those of an argillaceous character, are nearly always marked by contortions, to which those of a later date are strangers. It is from amidst them also that we have great bosses of granite coming to the surface, the contorted slate rocks surrounding them on every side. How is this? I will endeavour to explain.

My hot-tempered friend, the piece of granite, told you how it was absolutely necessary to his origin that the molten rock of which he was portion should be overtopped by a tremendous thickness of material when it was cooling. This my own experience will bear out. The contortions which characterize my family equally required an amount of overlying material to be piled upon them, or they could not have arrived at such singular appearances.

A mass of half-hardened rock, if displaced by a foreign body, such as a boss of granite being thrust up, would rise up as one great hill or mountain. But if there was sufficient pressure overlying the formation thus disturbed, then it would be thrown into a series of foldings, in order to make place for the laterally-intruded material. Of course the whole exterior surface would then be elevated; but this elevation would not be in a conical form, but along a large tract of country.

In geological books you will find how, on a small scale, this experiment has been conducted. A series of layers of cloth has been formed; pressure was applied to the sides, when the surface naturally rose into a sort of mound; but the moment a heavy weight was laid on the top cloth (thus representing the overlying material of which I spoke), then the layers of cloth, when pressed at the sides, became folded up into a series of contortions. My readers will now see why granite outcrops should frequently be the companions of slaty contortions; for the



agency of overlying rock-masses, which originated the former, by their pressing weight caused the latter, when disturbed, to assume the wrinkled, fantastic shapes they now present!

It is not long since the Cambrian formation was deemed the oldest in the world; even its most learned and indefatigable observer called it the *Protozoic*, imagining its organic remains to be the "first life-forms." This provisional place of honour, however, has since been bestowed on a still older, and of course even more contorted and metamorphosed a class of rocks, termed *Laurentian*. Whether this in its turn will have to give place to one older still I cannot tell; but this I know, that the more you study the rocks and their contained fossils in the field, the more will you be convinced of the enormous antiquity of the earth, and of the incalculable period during which life has been divinely manifested upon it! Human arithmetic will never be able to compute my own age, and therefore the very attempt would be futile. Seeing that we slate rocks are, as far as England is concerned, the oldest known, who can wonder we should be found in such a dislocated and contorted condition? Have we not had to bear the heat and burden of the day? All the rocks of later date have been uplifted into dry land from the sea-bottoms on which they were formed; and seeing we were older, it was impossible to elevate them without also raising us at the same time; so that the alternate elevations and depressions to which we have been subjected are innumerable. Meantime the overlying formations have been slowly eaten away, attacked either by atmospherical forces or by marine denudation.

Far distant though the period of my birth may be, I have a lively recollection thereof. I am well provided with "hints to memory," in the shape of fossils impressed on, or included in, my parent bulk. I have only to turn to these, and immediately the old life-scene vividly recurs to me. What a strange time it was, and how different to anything I have since beheld! I can readily understand how the earlier geologists should reverently regard our fossils as the first created. In them Nature seems almost to have "tried her prentis han';" for these earlier organisms bear about them the impress of a lowlier fauna. Not that any are found which cannot be referred to existing natural-history orders, for Nature, like her Lord, knows "no variableness or shadow of turning." Her plan has been to fill up the outline, and this has slowly been consummating during the unknown ages which have elapsed since the Cambrian period. Hence it is that the further you go back in time, the more simple is the *facies*, or general appearance, both of animals and plants. It is possible that, at the time I was born, the dry land was sparsely covered with a humble flora; but it will be evident that as I am of purely marine

origin, I cannot speak with certainty of what took place elsewhere. I have a dim recollection, however, of certain obscure mosses, lichens, and perhaps reeds, but nothing more certain. That there was dry land, and that this dry land was watered by extensive rivers, I have not the slightest doubt. Otherwise, where would the materials have been derived which make up the bulk of my parent formation? And, that this material was *slowly*, and not rapidly obtained, you yourselves may easily see from the fineness of the particles which enter into my composition. Time again! For the Cambrian formation is no less than eighteen thousand feet in thickness! and, with the exception of certain beds in the middle of this immense bulk (called by geologists respectively Harlech grits and Lingula flags), the rocks of this period are principally fine-grained slates. Even the grit-stones and flag-stones aforementioned are not of a very coarse texture, but equally attest to the slowness of deposition. I believe the whole of this formation was deposited in tolerably shallow water, not near so deep as the present Atlantic. You perhaps ask how it was, then, that the strata of a formation nearly three and a half miles in thickness could be deposited in only a tolerably shallow sea? The question is natural enough, and I reply by stating that whilst these strata were slowly forming, the sea-bottom was as slowly subsiding. Hence it remained at almost the same depth during the long period when these fine muds were thrown down. You will find this verified by the fact that in the Lower Cambrian (in a group called the Longmynd) the tracks, holes, &c., of marine worms (termed *Arenicolites*) are found distributed through a vertical thickness of over a mile of rock. Nor are these humble organic remains scarce; they occur in countless myriads. After the deposition of the Lower Cambrian rocks, as far as I can recollect, the sea began to get deeper; the deposits formed along its bottom did not quite equal the rate of depression, and so the depth of water increased; but before then I well remember how comparatively shallow the sea was. This is attested not only by the countless fossil worms which have won a geological immortality from the trails they left on these early sea-bottoms; but also from the ripple-marks which equally characterize the same set of strata. Nay, we have even evidence of extensive mud-flats, for many of the beds are pitted with rain-drops, and marked with sun-cracks. Thus, far back as English geology can take you, you have evidence of exactly the same kind of meteorological agencies as those which now regulate the physical well-being of the external globe. Cloud and sunshine are testified to by these sun-cracks and ripple-marks. Vapours were raised of solar heat then as now, and the bow was set in the cloud, although not as yet selected as a covenant to man.



In the same beds as these ripple-marks, sun-cracks, rain-pittings, and worm-tracks, we have innumerable remains of a small crustacean (*Palæopyge*), which used to flit through the shallow water in dense shoals. A pretty little zoophyte (*Oldhamia*) lived in quiet, sheltered spots, where it luxuriated abundantly, its little branched stems forming miniature forests along the old sea-bottom. These lowly creatures are almost all I remember of what is called the Lower Cambrian formation. The upper portion, however, is much richer in fossils; and well do I remember when these now petrified creatures enjoyed the pleasures of animal life. Between the deposition of the strata of these upper and lower formations there was a break in the locality where I was born. Probably somewhere else in the globe there will be found a formation (possibly limestone) which was elaborated during this provisional rest. Of that, however, I can only conjecture. Concerning the animals which lived in the Upper Cambrian seas, I can speak more positively. They were, first of all, far more abundant, both in species and individuals. Thus the basement rocks of this subdivision go by the name of *Lingula* flags, from the vast quantities of the fossil of that name occurring in them. The *Lingula* was a mollusk occupying the lowest class among shell-fish, that termed *Brachiopodous*, or "arm-footed," from the peculiar arrangement of the cilia. Strange enough, this genus is still in existence, and you can hardly tell the difference between the horny shells of the living species and that which lived at this early epoch. Talk about genealogy; no other family, except that of the marine worms, can claim an antiquity so vast. Notwithstanding all the mutations through which the surface of our old world has passed—the upheaval of sea-bottoms into mountain-heights, the depression of mountains into sea-bottoms—this one genus of shell-fish has triumphantly surmounted them all! It is now, I am told, fast passing into extinction, the final lot to which so many genera of subsequent date have succumbed. Among other animals which lived at the time was a species of shrimp (*Hymenocaris*), whose remains may be met with in the same rocks. Along this sea-bottom, in various places, lived colonies of a kind of sea-lily, or rather, of an animal halfway between these and the more recent sea-urchins: these now go by the name of *Cystideans*. Furnished with a short footstalk, which served to anchor them to their selected habitats, they flourished on the foraminifera which swarmed in the waters of these primeval seas.

Later on was introduced a crustacean afterwards to become famous, both for its abundance and the number of generic and specific forms it assumed. This was the well-known *Trilobite*. Several genera, and still more numerous species, were in existence, and so fast did the newly introduced species breed,

that they became the tyrants and scavengers of these early seas.

Most of my listeners are acquainted with their trilobed forms (whence their name), and have admired the jointed coat of mail which protected them, and, at the same time, gave them all the necessary flexibility for movement.

Out in the deeper water lived a peculiar kind of mollusk, whose type is still living. This is termed *Theca*, and its external protection consisted in a thin, almost glassy case; not so fragile, however, but that it has been carefully fossilized. But in gritty sandstones, or coarse slates, it is rare you will find any remains of the old calcareous shells of the various creatures I have named. Subsequent changes, most of all the percolation of draining water, have removed the limy material; so that the fossils found are principally as *casts*. Perhaps the lime thus removed has, in many cases, served as a natural cement to the sandy or clayey particles, so that much of the hardness which now characterizes these rocks was originally due to the limy substance of the Cambrian inhabitants.

Towards the close of this remarkable period, other forms of life appeared, the total number of genera and species considerably increasing. Shell-fish of a higher grade were introduced, until the highest type—the *Cephalopoda*—was brought on the stage of existence in the shape of *Orthoceratites*. These were allied to the living nautilus, only they had straight chambered shells, instead of coiled ones. Their arms, something like those of a cuttle-fish, extended out of the last, or body-chamber; and on these, with shell inverted like a spire, the creature would occasionally crawl over the muddy sea-bottom where I was slowly forming. Belly-footed mollusca (*Gasteropoda*), in the shape of a genus which has been extinct since the time of the coal formation, crawled about as *Bellerophon*, its gracefully coiled shell being as beautiful as any of its recent representatives. Thus did the Cambrian period come to a close.

Of course my listeners cannot expect one poor memory accurately to remember all the types of life then existing! Suffice it to say that, compared with those of subsequent periods, they were few and of a much lowlier kind: numerical abundance of individuals made up for poverty of genera and species. It was the dawn of life—when organisms were in the cradle. Betwixt this and chaos was a great gulf fixed. The first outlines of that grand scheme which should ultimately link inorganic matter with spirit, were then rudely sketched. Time was ordained for the sole purpose of filling them up, and, when the object is completed, time shall be no longer! Even since this distant period, life has progressed until it has reached its physiological maximum in man. But in him, I am told, appear the germs of a new spiritual life, whose de-



velopment shall extend into the future, just as organic life has been developed in the past! Such are a few of the reminiscences of a piece of slate! Of the agencies which uplifted me into a mountain-ridge, which consolidated the fine mud where I was born into hard slate, I cannot tell. These are all included in those chemical and geological changes which took place after my birth. But, whilst I have thus endeavoured to administer to the intellectual curiosity of man, I cannot forget that it is to these subsequent alterations that I am what I am, and that I now assist in roofing in and protecting the latest introduction of nature in the form of man!

#### LOCAL TRANSACTIONS.

*Transactions of the Woolhope Naturalists' Field Club for 1869.* Hereford, 1870.

This annual volume is fully up to the standard of its predecessors, and gives evidence of a healthy and vigorous club. The illustrations are excellent. Photographs of the remarkable trees of Herefordshire are continued, and so are Dr. Bull's characteristic figures of esculent fungi. The present volume contains *Hydnum repandum*, *Fistulina hepatica*, and *Agaricus Orcella* and *A. prunulus*, Dr. Bull considering the two latter to be specifically distinct. Mr. W. G. Smith's plate of *Cortinarius russus* leaves nothing to be desired, and his "Clavis Agaricinorum" appears here, as well as in Seemann's "Journal of Botany." The "List of British Agaricini" including 701 species, is a very useful appendix to the "Clavis." If continued in this spirit, the series of Woolhope Transactions is likely to prove a valuable contribution to the natural history of Herefordshire.

*Proceedings of the Birmingham Natural History and Microscopical Society for 1869.* Birmingham, 1870.

The preface explains all that needs explanation of this series. "This volume owes its origin to a desire frequently expressed by the members of our Society to possess some permanent record of its proceedings, and comprises the substance of some of the papers read during the year 1869, together with a brief reference to others which it is impossible now to reproduce or unnecessary to present in an extended form. A large portion of the most useful work of the Society being performed through the agency of its several sections, it is a source of some regret that it has been found impracticable to include much valuable local information collected as the result of their labours; but the committee hope to present much matter of this kind in subsequent volumes. Meanwhile the lists which form the latter portion of the present publication must

be regarded as a first instalment towards a complete record of the Flora, Fauna and geological treasures of our district, the materials for which the several sections are steadily engaged in accumulating." This is a move in the right direction. The lists include the flowering plants and ferns, mosses, Lepidoptera and Mollusca. Go on and prosper!

#### LOTUS.

YOUR correspondent Mr. Hall, in a short paper on the "Lotus," says:—"But it is supposed that the true sacred lotus of Egyptian antiquity belongs to the Nelumbiaceæ, or Water-bean family, indicated as *Nelumbium speciosum*, a point that may be considered definitely settled from the fact that it is also called by the Greek word for bean." And in a little book supplied to visitors at Kew Gardens, Mr. Oliver writes:—"The sacred lotus of the early Egyptians (*Nelumbium speciosum*) is still regarded as an emblem of sanctity by the Hindoos and Chinese." But Sir Gardner Wilkinson, after quoting Plutarch:—"They do indeed characterize 'the rising sun' (the god Eihva, the Sun, the Day, the Dawn)" as though "it sprang every day afresh out of the lotus plant," goes on, "I must, in conclusion, make this remark on the lotus plant, on which he is represented seated—that it is always the 'Nymphcan Lotus,' and in no instance the 'Nelumbi.' And though this last is mentioned by several among the plants of Egypt (Pliny describes it as growing in the Nile,—one of the wild plants which abound so plentifully in Egypt), it is never introduced into the sculptures as a sacred emblem, nor, indeed, as a production of the country; a fact which goes far to disprove one of the supposed analogies of the Egyptian and Indian objects of veneration. With regard to the common lotus, so frequently represented as a favourite flower in the hands of the Egyptians (as the rose or others might be in the hands of any modern people), there is no evidence of its having been sacred, much less an object of worship." The *Nelumbium*, from its lofty stems, large leaves, and elegant flowers, seems so much more worthy of the affection, if not the reverence, with which it is said to have been anciently regarded, and of the admiration which it now commands, in comparison with its less aspiring relative and neighbour at Kew, that it would be pleasant to be assured of the title to eminence which the former has so generally obtained being really well established; to which end I should be glad to learn on whose authority this question has been decided in opposition to that of Sir G. Wilkinson, and shall be obliged by some further information on this interesting subject.

C. F. WHITE.



## ZOOLOGY.

GREAT SHRIKE.—At the meeting of the Zoological Society on the 23rd of June, Messrs. H. E. Dresser and R. B. Sharpe read a paper on the Great Grey Shrike (*Lanius Excubitor*) and its allies. The differential characters of the various species were pointed out, and special attention was drawn to the Indian Grey Shrike (*Lanius lahtora*), which was considered to be identical with the Algerian *Lanius pallens*, vel *dealbatus*.

ATTRACTIVE PLANT.—I find a common garden plant, the Snowberry (*Symphoria racemosa*), which has round white berries in August, very attractive to Noctuæ when in flower; I have taken many species at it this June.—*H. C. Leslie, Erith.*

ROOKS.—In a recent number of Cassell's "Book of Birds," there is, I believe, a mistake. In speaking of the Rook, the author says, "These birds are distinguished. . . by the bareness of the face observable in the old birds, occasioned, probably, by continually *rubbing it upon the ground* when in search of food." And, again, "The hungry rooks actually rub the feathers from their faces by constantly *burrowing in the ground* with their beaks." After Waterton's able Essay on this subject (*vide* "Essays on Natural History," 1st Series), it is needless to argue further on this absurd hypothesis.—*H. C. Sargent, Warrington.*

SHARKING.—When out fishing yesterday, about three miles off Towan Head, we captured a blue shark, which measured four feet in length, being about one year old. On examining him we were much surprised to find three letters, U. N. F., branded on its left side, under the back fin, and from the inside of which we took a pilchard measuring nine inches in length. Two other sharks were also captured, one of the common, the other of the blue species, which are considered scarce along this coast. Several dog-fish were also seen by us during the day, which, I need not add, greatly interfered with our fishing arrangements.—*Frederick Newton.*

COWPER AND THE NIGHTINGALE.—With reference to the song of the nightingale which the poet imagined that he heard in mid-winter, it may be interesting to some of the readers of SCIENCE-GOSSIP to learn that a caged [nightingale, kept as a pet for some time in my father's house, commenced to sing on the 1st or 2nd of January. I write from memory, but I believe that this took place during three successive winters. The bird lived in captivity about four years, and was quite tame. His song was magnificent, and more connected than

that which one hears in the woods; it usually ceased in May.—*E. E. S., Beaumaris.*

OTTERS.—On the 23rd July, an otter was killed at Reeds Merc, near Capesthorne Hall, Cheshire, by Lord Hill's pack of otter-hounds. Another otter was started near Chelford Chapel, but was afterwards lost.—*G. H. H.*

QUAIL'S NEST NEAR LEEDS.—I have just been presented with four eggs out of twelve, found in a grass field near here. They were mown over and taken by the mowers, and given to a boy, who took them to Mr. Emmett, a taxidermist, who secured the lot. They did not appear to have been sat upon. The parent birds have been heard, but not seen, and, as it is quite uncommon here, no one knew what they were. Is not the number large for so small a bird as the quail to cover? Should be glad to know whether it is common for them to lay so large a number of eggs. It was the most beautiful egg sight I ever witnessed, being all splendid specimens.—*William Liversidge, Stansfield Row, Burley, Leeds.*

DEILEPHILA GALII (Scaree Spotted Hawk-moth).—A fine specimen of this scarce moth was caught in the grounds of the Crichton Royal Institution, Dumfries, on the 7th of August; thus adding another valuable specimen to the already magnificent collection collected and arranged by Mr. William Lennon, of this Institution.—*W. B. Gibson.*

PENCIL-TAIL (*Polyxenus lagurus*).—Mr. S. J. M'Intire read a very interesting paper on this subject at the last meeting of the Quekett Microscopical Club (July, 1870), in which he gave some valuable details of their habits, and exhibited living specimens.

VANESSA ANTIOPA (Camberwell Beauty).—I had the gratification of capturing a beautiful specimen of this rare butterfly on the 18th August, 1870, at Delee, Rochester, Kent. I should like to know if any one else had been equally fortunate.—*James Fletcher, Rochester.*

MOLLY-HAWK.—It is the lesser Albatross, is about half the size, and differs in the colour of the feathers on the back, which are black; the full-grown albatross being a rich pinky white all over when alive and full-grown. Some specimens in the British Museum.—*E. H. Moore.*

FORAMINIFERA.—The last part of the *Linnean Transactions* contains a valuable paper by Messrs. Brady, Parker, and Jones, called a "Monograph of the Genus Polymorphina," illustrated by four plates of figures. We commend this communication to the notice of all who are interested in the study of these organisms.



## BOTANY.

HERB PARIS (p. 164).—The Rev. J. S. Hinslow, in his paper on *Paris quadrifolia* (Loudon's *Mag. Nat. Hist.*, v. 431, 1832) records two examples only, out of 1,500 which he examined, in which the number and arrangement of parts was the same as that mentioned by Mr. Acland. In one instance there were 10 stamens, in the other 9. I have more than once met with a dandelion similar to that which he describes.—*James Britten, F.L.S.*

HOLLY IN BERRY (p. 186).—I have seen trees similarly full of berry in several places during July, and one at Uxbridge on the 31st of that month. Mr. Henry Reeks, in *Nature*, for June 9, draws attention to the same circumstance, and seeks an explanation of it.—*James Britten.*

ENGLISH PLANT-NAMES.—Our correspondents, who have so kindly responded to our appeal for assistance, as well as other readers of these pages who take an interest in this matter, may wonder—and not without reason—why the book upon “English Plant-Names,” which we have for some time announced as being in preparation, should be so long in making its appearance. But the great number of independent lists of names which have reached us from all parts of Great Britain, and more especially of England, entailing a vast amount of comparison and correspondence; the ponderous volumes containing the writings of the old English herborists that have had to be waded through, and the plants mentioned in them identified; the numerous local glossaries that have had to be consulted; the archaic dictionaries that have had to be turned over, page by page; to say nothing of little bits of information that we have picked out and jotted down from many books on many subjects,—all these have caused our work to grow upon us to such a degree, that it has become far more bulky and laborious than we at first contemplated, and we have thus been hindered from redeeming our promises as soon as we could have wished. We hope, however, to complete our preparations early next year, and shall be glad if those who have any further communications to make will do so as soon as possible. Any lists of, or notes on, Scotch or Irish names will be especially welcome, as in these we are somewhat deficient. The mass of folk-lore and tradition in connection with our subject which has “cropped up” during our inquiries, has, however, proved so extensive, that we have determined on preparing a separate volume, to be devoted exclusively to the folk-lore—either of botany alone, or of natural history generally; and with this end in view we again confidently ask our friends for contributions. There may still be found, in the far-away corners of old England, the relics of many strange

customs and of curious popular beliefs, with many legends and traditions connected with natural history; these it is our object to secure and put on permanent record, ere the sure and steady “march of intellect” shall consign them to oblivion. Communications may be addressed to either of us as below, or through the Editor of SCIENCE-GOSSIP.—*James Britten, F.L.S., Royal Herbarium, Kew, W.; Robert Holland, Mobberly, Knutsford, Cheshire.*

LIMNANTHES DOUGLASII.—Strolling last June along the banks of the Thames near Reading, between Purley and Pangbourne, I noticed, growing close on the edge of the water, what, at first sight, appeared to be a very large water ranunculus; but, on getting down the bank and gathering it, I found that it had a five-lobed ovary and definite stamens. On walking on a few yards I saw a second cluster, and further on another; the plant growing in little tufts here and there for about two hundred yards along the bank, having already, or bidding fair to, establish itself. After some inquiry it proved to be *Limnanthes Douglasii*, a plant belonging to the small North American natural order *Limnantheaceæ*. The following is a short description of it:—Stem trailing, succulent, glabrous. Leaves alternate, exstipulate, pinnate. Peduncles one-flowered. Flowers [regular. Sepals five, valvate, lanceolate. Petals five, yellow at the base, white at the apex, emarginate. Stamens ten. Ovary superior, five-lobed, with one ovule in each lobe. Style one. Undoubtedly, the plant first sprung up here from seeds carried down the river from some garden higher up. It seems, however, more probable that, having found a suitable home, the present number of individuals is rather the results of seeds ripened on the spot, than that they are all the product of those thus brought in one season. Hence it is not unlikely that this may have to be included among our naturalized plants.—*A. French, Banbury.*

BARTSIA ODONTITES (Huds.).—As Dr. Bromfield (*Flora Vectensis*, p. 362) records two localities in the island, where the white-flowered form of this plant has been found, I presume it is sufficiently rare to merit the re-insertion of a third habitat in which I have met with it during the last few days—viz., at Soak Farm, and near Freshwater mill, Freshwater. (P. 186, 2nd col. of SCIENCE-GOSSIP, for “wild” read “milk” thistle.)—*R. T., M.A.*

BOG PLANTS, FRESHWATER, ISLE OF WIGHT.—Dr. Bromfield states that he never saw *Utricularia vulgaris*, L., or *Cladium Mariscus*, R. Br., in flower at Easton Marsh. The former is now (August 7) in fine condition, and was also in flower about the same date two years ago. The latter is in fruit, with evidence of numerous plants having been in flower this season. These last were close to the water, if their roots were not actually in the water,



agreeably to the statement he makes with regard to the condition apparently necessary to the full development of the inflorescence. *Butomus umbellatus*, L., is in fine flowering condition, and spreading. Numerous other good plants are to be met with at this capital botanical spot.—*R. T., M.A.*

PLANT-NOTES.—Old Gerard traces the English name of *Chenopodium bonus Henricus*, L., "Good Henry," to a practice of the Germans, who, he states, called a plant with bad qualities, "Bad Henry," but this, because of its imputed good qualities, "Good Henry." Ray, in his Catalogue of Cambridge Plants, A.D. 1660, explains, upon the authority of Dodonæus, "Bonus Henricus" to be a name given to this plant because of its useful properties, which he enumerates as "serving to cleanse dirty ulcers, and to heal them; and, as a poultice, to soothe the pains of gout." But I find no information in any book of the reasons for the addition of "king" to the name. "Good King Harry" seems to allude to our Henry VIII. Now that king fattened his favourites upon other men's wealth, just as this plant flourishes best upon cultivated soil; but whether such an allusion was designed, persons learned in the history of plant-names best know. The notice of *Veronica Buxbaumii* justifies me in the remark that the species is not perhaps more common than formerly, but that it had been generally overlooked as a form of *V. agrestis*. I have no doubt of its being a native of this island. For instance, when the cutting for the branch rail from Harrogate towards Ripon was made (in 1862), in a few months the newly-made banks were covered densely with this plant, mixed with *Galeopsis versicolor* and other more common field species. *V. Buxbaumii* is spread widely over the high ground above Ashbourne, and I have noticed it on broken ground about Denbigh Castle. The publication of the excellent figure in the supplement of "English Botany," has led, probably, to a more exact discrimination of this species; but that circumstance makes the plant none the less native. The "animated oats," so called, are *Avena fatua* and *Pennsylvanica*, both of which I enclose. If a dry seed, or rather dry flower, of either species, be suddenly dipped in water, shaken, and laid on a table, the untwisting of the awns and the contraction of the bristly hair of the florets cause the sudden jerks and eccentric movements, which amuse children of all ages. That movement is designed to facilitate the burial of the seeds in the soil. The hairs at the base of the florets take hold of the earth, and hold fast the seed, as it works its way deeper, while the awns, expanding or contracting, effectually screw the seeds into the soil. I have seen the seeds of *Stipa pennata* buried two inches in a week by means of the feathery awn.—*Gerard Smith, Ockbrook.*

PHACELIA TANACETIFOLIA, Benth. (pp. 167, 189).—"An inhabitant of California, whence its seeds were sent by Mr. Douglas to the Horticultural Society of London. It is a species in some respects approaching *P. congesta* (*Botanical Magazine*, p. 3452), discovered by Mr. Drummond, in Texas, almost at the same time that the present species was detected on the Pacific side of North America." *Botanical Magazine*, p. 3703, where there is an excellent figure of the plant.—*James Britten.*

ANIMATED OATS (p. 190).—The manœuvres of the oats referred to by Mrs. Watney are due to the hygrometric property of the awns. These are long, and spirally twisted in their lower portion; and when the oats are soaked in water, the awns swell, and become somewhat untwisted. When placed upon a warm plate, or even upon the hand, they commence to coil up again, sometimes twisting in opposite directions; and their contortions are then very amusing. Electricity, however, has nothing to do with the phenomenon. The oats are produced by *Avena sterilis*, L., a native of the east of Europe, cultivated in English botanic and "curious" gardens.—*James Britten.*

ACERAS ANTHROPOPHORA (p. 189).—Mr. Grindon is not responsible for the statement to which Mr. Lees refers. The locality was recorded by Mr. T. V. Wollaston in the *Phytologist*, i. 523, old series (1843); and Mr. Watson ("Cybele," ii. 432, and "Compendium," 327) quotes it without any expression of doubt; so that we may safely conclude that the plant has been found there, even if it have now disappeared. Mr. Lees will remember that the disappearance of many orchids (especially *Ophrys apifera*) from localities which have produced them abundantly for many years, is by no means of uncommon occurrence.—*James Britten, F.L.S.*

HANDBOOK OF BRITISH FUNGI.—The first part of this work, consisting of nearly 400 pages, and containing the larger fungi, is nearly ready, and will be delivered to subscribers who desire to have it for autumn collecting, early in September. The amount of subscription, together with sixpence for postage of the two parts, can be sent by Post-office order, payable to M. C. Cooke, at Charing Cross Office, when the first part will be forwarded. It will only be delivered to subscribers whose names were sent in before July, when the subscription list was closed.

EAST LONDON NATURALISTS' SOCIETY.—A society under this title is just being established for the east end of London. Further particulars may be obtained of J. W. Love, secretary, 23, Fairfoot Road, Bow.



## NOTES AND QUERIES.

MINIATURE PHOTOGRAPHIC APPARATUS FOR TOURISTS.—The little camera, the outside dimensions of which are three and a half inches all ways, with lenses for landscapes, architectural subjects, etc., and the necessary slides for twelve pictures or negatives, are very readily carried in the pocket, or, if preferred, can be packed into a small leather sling case measuring  $7 \times 4 \times 7\frac{1}{2}$  inches deep, and weighing with plates  $4\frac{1}{2}$  lb. It is only necessary to carry, in addition to this, a small stand not heavier or more bulky than an ordinary Alpenstock. The process that is worked in this apparatus is so simple that no previous knowledge of photography is necessary for the amateur to make pretty sure of obtaining good results. The plates are ready prepared, and we are informed will keep any length of time, and can be developed at any period after exposure, so that the traveller brings home exact transcripts of whatever he may desire, with no further trouble than pointing the camera at the object to be taken, and opening the slide containing the prepared plate. The plates so exposed can be returned at convenience to the makers, to be developed and printed. Of course the negatives and prints thus obtained are very minute, some two and a half inches square; but even of this size they are perfect little gems. Should a larger size finished picture be desirable, having once obtained the negative it can be enlarged to almost any extent. This apparatus may be obtained of Murray and Heath, Opticians, Jermyn Street.

ANIMATED OATS.—With regard to the query of Mrs. Watney about Animated Oats in this month's SCIENCE-GOSSIP, all I can say is that a few were given to me some years ago; I have since planted them, and they have come up well, and born a fine crop. I may add that they never condescended to "hop and skip about" for me, unless I had previously soaked them in water. I therefore consider the curious movements of the awns in some manner due to this operation.—*J. S. William, Durham.*

HODDY DODDY (pp. 70, 93, &c.).—In looking through the pages of an old book (published in 1739) the other day, I came across a vocabulary of cant terms used by gipsies, and among them found "Hodmended, a snail in its shell." It is most probable that Hoddy Doddy, whether applied to the snail or its shell, or both, is only a corrupted form of Hodmended.—*E. T. Cox.*

QUERY ABOUT BEES.—Your correspondent Mr. W. W. Spicer asks: "Do bees confine themselves to a single species of plant when collecting nectar and pollen, during a flight out and home?" My neighbour, Mr. Morse, the florist, who keeps bees, thinks they do, and the uniformity in the specimens of pollen which my friend Mr. Cubitt and myself have found on the bees which we have microscopically examined, seems to establish the fact. The following extract from "A Theatre of Politicall Flying Insects," by Samuel Purchas, M.A., in 1657, bears on the point, and may prove interesting to your readers. He says, on p. 95:—"Bees have this property, that whatsoever flower they first begin with when they goe to work, they meddle with no other that journey, but lade themselves with such meat alone as that kind yeildeth; this is a common, but no catholique, custome, for I have often observed the contrary. It is true, if there be flowers enough near at hand, to make up their burden of that sort they begin

withall, they will meddle with no other; but if they have begun to gather of a flower that likes them, and cannot finde enough to furnish them, then they will make up their load of some other. Arist. de Hist. Anim., a. 9, c. 40."—*W. T. Iliff, Epsom.*

HAIRS OF SUNDEW.—Can any of your readers kindly tell me how to proceed to prepare the hairs of sundew, to show the spiral cells as figured in SCIENCE-GOSSIP for May, p. 111?—*W. W.*

SMALL EGG.—I have in my possession a black Spanish hen's egg of so small a size that probably the dimensions may be interesting. Circumference round the two ends,  $4\frac{3}{4}$  inches; round middle  $4\frac{1}{2}$  inches; length  $1\frac{1}{8}$  inch.—*J. R.*

FLORA HANTONIENSIS.—I am sorry that I cannot answer this question for your correspondent "R. T., M.A.," but I may state that the best flora of Hants at present extant, is undoubtedly that compiled by the late Dr. Bromfield, and published in the *Phytologist*. If "R. T., M.A." has not the volumes of the *Phytologist*, and would like to see Dr. Bromfield's "List," I shall be happy to lend them to him. I have never met with the "Annual Hampshire Repository"—at least the volume referred to by "R. T., M.A."—*Henry Reeks, Thruxton, Andover.*

BORAGE.—This plant was formerly considered very useful in different hypochondriacal complaints. Hence the name of borage, derived from "*cor*," heart; and "*ago*," to bring; as it was supposed to exhilarate the spirits. The young tender leaves are still in request whenever the good old English drink, known as "a cool tankard," is made.—*Helen E. Watney.*

VALISNERIA SPIRALIS.—"J. M. A.'s" remarks upon the blossoming of this beautiful plant (p. 190) find an exact echo in my own experience. I have never noticed in my tank any other than female flowers, though these have appeared for the last four or five years in the utmost profusion.—*Edward Banks.*

GREEN WOODPECKER.—I see, from a paragraph in "Notes and Queries," that the name of "rain-bird" is given to the common woodpecker in many parts of the north of England. It may be interesting to those who are curious about provincial names, to hear that in this neighbourhood the country people give it the less elegant, but equally expressive, name of the "wet-bird," as its cry frequently repeated usually foretells rain. I have generally found it a true prophet.—*E. A. J., Moretonhampstead.*

MOLLY-HAWK.—In answer to Mr. A. Aldridge's question in the August number of SCIENCE-GOSSIP, I beg to inform him that the bird known by seamen as the "Molly-hawk" is the Sooty Albatross (*Diomedea fuliginosa*, Latham). It is also by some called the "Badie-hawk," and by others the "Badie-Auk," and its big brother (*D. exulans*, Linn.) is known to them as the "Molly-muck."—*G. Sim.*

PHOSPHORESCENCE.—What animal or animals inhabiting peat bogs are phosphorescent? Peat is not favourable to abundance or variety of life; and, until lately, I was not aware that the phenomenon of phosphorescence was displayed by any of the creatures who tenant our bogs. Last July, however, I chanced to be benighted on a wild mountain-range



in County Derry, and had an opportunity of observing the fact myself. These mountains are covered by a continuous succession of peat bogs; and, while wandering among them, making unsuccessful search for a shelter, I noticed repeatedly that, in places where I set my foot, a number of bright lights burst out. The phosphorescence was not shown on grassy or heathy ground, but in bare, wet, turfy spots, where one's boot sank in peat mud. It was not a diffused light, but numbers of brilliant little spots, as many as half a dozen of which lighted up a footprint, and shone for three or four minutes. I regretted much that I had no bottle nor anything else available to secure specimens for examination; some I placed amongst plants in an already well filled *vasculum*, but they could not be found when I reached home. Our books, when treating of the phosphorescence of animals, speak mainly of fire-flies, glow-worms, and various marine species. I am at a loss to know what it was that so surprised me with its brilliant light, at midnight, in the dreary mountain bog—was it caused by insect larvæ?—*S. A. S., Belfast.*

**HOW THE CHINESE CATCH EELS.**—Sailing along river or canal, the traveller occasionally sees in the dusk of the evening, among the lotus flowers and fringes of reeds which border the streams, four stout coolies vigorously shaking an object over a basket. A nearer approach reveals the unusual sight of a corpse being denuded of the silver eels which have collected in it during the day. Where those exquisite and beautiful fish abound, the fishermen are on the alert to detain any remnant of mortality floating along, by tying it to a stake. Nightly the shaking of the defunct proceeds, and is continued time after time as long as the remains cling together.—*Food Journal.*

**ORDNANCE AND FISH.**—A correspondent of a Cornish weekly paper says interesting proof has been afforded that the firing of heavy ordnance does not in any way affect the catches of fish. Captain Banks, commanding the artillery volunteers at Charlestown, Cornwall, postponed practice with the heavy guns of his battery in consequence of the presence of mackerel in the bay; but after their absence on the coast for a fortnight or more, he ordered a parade, by way of dispelling the idea, so prevalent, that the report from firing heavy guns drives the fish into deep water. The practice last week was brought to a conclusion, after about fifteen rounds, by the appearance of several very large shoals of mackerel directly under the battery, which is about one hundred feet above sea level. They were observed by the look-out men on shore, who gave an alarm, which resulted in several nets being shot.—*H. Budge.*

**HOLLY IN BERRY.**—It may interest "J. D." to know that a holly is now in full berry (bright red) in the garden of the Rev. D. H. Ellis, of Roydon, near Lynn. I have not seen any other example.—*A. E. B., August 8, 1870.*

**BORRAGO** (pp. 165, 189).—I have to thank "G. H. H." for his remarks, though I was acquainted with much of what he states. I am also aware that French botanical writers use the reduplicated form. Some English writers also give the form "barrage" as one of the ingredients of the well-known beverage, "eider-cup." What I want is some authority similar to that which must have led Dr. Hooker to adopt this form in preference to that

familiar to us in the floras of Babington, Bentham, and others.—*R. T., M. A.*

**QUERY ABOUT BEES.**—The Rev. W. W. Spiecer asks if "bees confine themselves to a single species of plant when collecting nectar and pollen during a flight out and home." I answer—most certainly, as a rule, except perhaps in the spring of the year, when the sun tempts them forth from the hive before many spring flowers are in bloom. I have often, this summer, as well as in previous years, watched the bees in flower-beds of mignonette, petunias, fuchsias, calceolarias, &c., but I invariably noticed that they adhered strictly to one species of plant; *i. e.*, those which first visited the mignonette took no notice of the petunias, &c., and *vice versa*. I am inclined to *think*—for I am no apiarian—that this sticking to certain species of plants may be confined to a certain number of bees in a hive, which have a certain portion of work allotted to them; or, rather, perhaps at certain times, have cell-making, or some other work, to perform, which requires "nectar or pollen" of exactly the same consistency, &c.; and instinct would show them that this could only be obtained from the same species of flowers. I think Mr. Darwin informs us, in "Origin of Species," that the hive bee does not visit the red clover (*Trifolium pratense*); but this is quite a mistake, as I have repeatedly seen them do so; but whether they make an incision in the tube of the corolla themselves, or take advantage of the holes cut by the genus *Bombus*, I am unable to say.—*Henry Reeks.*

**THE ASSEMBLING OF MALE MOTHS.**—Is it by *smell* they are attracted? The following incident seems to support that theory. Returning from a collecting excursion on the evening of August 13th, I noticed several moths about a furze-bush. Peering into it, I saw one creeping slowly about, and fluttering its wings tremulously. I took it with my hands, and put it into a perforated tin-box, which smelt of chloroform, and placed it at the root of the bush (this was a female, for it afterwards laid me a number of eggs). Males came about in numbers, and hovered especially about that part of the bush from which I had taken the female, and my hands even touching them, so that I caught them easily; but although some occasionally came very near the box, they seemed perplexed, and soon left it. From that I conclude that they were attracted by the *scent* of the female; but that the smell of the chloroform so confounded it that they could not find her, under those circumstances, but continued to seek her by the scent left upon the bush and upon my hands.—*J. H.*

**TRANSPARENT PAINTING ON GLASS.**—Under this title a shilling manual is published by Brodie & Middleton, of 79, Long Acre, London, including instructions for painting slides for magic-lanterns. The same firm also supply water-colours, and varnish-colours, prepared specially for glass-painting. As several correspondents have, from time to time, made inquiries of us upon this subject, the present notice may be accepted as an answer to all of them, how they can obtain all the information they require, as well as materials for pursuing the art of glass-painting. From experience we can say nothing, as we have never indulged in the "hobby," and never made experiments; but those who feel impelled in this direction, will doubtless find in this book and these colours just what they require.



**CLEANING FORAMINIFERA AND SHELLS.**—In reply to Henry Lee, *SCIENCE-GOSSIP*, July, p. 167, as to cleaning Foraminifera, allow me to give him my experience in procuring them from sea-sand. In the first place I obtained from a wholesale sponge-merchant, with whom I deal, a parcel of sand, from Turkey sponge. He kindly sent me twenty pounds' weight. I sifted it through a sieve of sixty meshes to the linear inch. This removed most of the shells, except a few extremely small ones. The sand was thus rejected. The shells were then divided into four portions, by sifting through three other sieves, the coarsest of which had sixteen meshes to the linear inch. This last removed many larger shells, fragments of seaweed, sponge, &c. Each portion of the Foraminifera was now placed in a Florence flask, with about twice its bulk of liquor potassæ, and boiled for a quarter of an hour. The liquor potassæ, which was now nearly black, was poured off, and replaced by water, in which the shells were again boiled for a quarter of an hour. This was poured off, and the flask filled with clean water. There was a quantity of fine vegetable matter, not soluble, in the potash. This was removed by rotating the flask, allowing the shells to settle, and carefully pouring off the water. This had to be done several times. The whole was then poured into a paper-filter, set in a funnel, and as the water filtered away, fresh was poured till all the potash was removed. It is necessary to tap the side of the funnel gently, so as to cause the shells to settle, and to shake the fluid out of them. Lastly, the filter and its contents were placed on a plate, and dried in the oven. From twenty pounds of sand I procured three ounces of cleaned and dried Foraminifera. Few things exceed the beauty of these minute shells in their pearly whiteness. Mounted dry, they are especially suited for the binocular, and, when well mounted in balsam, are splendid polariscope objects.—J. C. H., *SCIENCE-GOSSIP*, August, p. 190, will find steeping or boiling in liquor potassæ about the best thing for cleaning the dirt out of the small shells he speaks of.—J. H.

**VARIATIONS OF LEAVES.**—C. L. J. is thanked for his communication on this subject. It is no unusual circumstance for plants of the cabbage tribe to produce an abnormal growth from the *surface* of their leaves. This sometimes takes the form of a frill at each side of the midrib, when a section of the leaf is tetrapterous. At other times a number of small cups are produced, which exactly resemble the fungus called *peziza*, only they are green instead of red. A distinct cup, the size of a wine glass, and elevated on a stalk three inches long, as described by C. S. J., is not of such frequent occurrence. Some interesting information on the subject of the formation of adventitious pitchers, and concerning hypertrophy in leaves, will be found at pages 21 and 445 of Masters' "Vegetable Teratology." A pitcher, formed by the *plumule* of a vegetable marrow plant, described as follows by C. L. J., is very remarkable:—"From between the seed leaves, instead of the usual outgrowth, there springs a single stalk, on the top of which is a large cup. This cup is exactly like the ordinary leaf, except in its queer shape; it is large enough to contain several wine-glasses of water, but it appears to put an end to the plant, for there is no visible eye from which a proper shoot could spring." Probably this pitcher is formed by the cohesion of several leaves, and its growth has in some way caused the suppression of the axis of the plant. It is, however,

not uncommon to find the *entire plumule* suppressed in cabbages and in celery. In these cases the cotyledons are the only leaves produced, and the plant, after a while, dwindles away entirely.—Robert Holland.

**THE UPAS TREE.**—Our old friend the Upas Tree turns up again in *Cassell's Magazine* for August, p. 536, with the same thrilling account of the method in which the gum is procured, which, we hoped, had been consigned to the regions of "old wives' fable-dom."—See *SCIENCE-GOSSIP*, 1868, p. 266.—James Britten.

**BORRAGO** (pp. 165, 189).—"R. T., M. A." will find this name and its compounds with the double *r* in Le Maout and Decaisne's "Traité de Botanique;" in Decandolle's "Prodromus;" in Walper's "Annales," and in most foreign botanical works. In England, however, the single *r* seems to have been the general use from the days of Turner's "Herbal" (*q. v.*) to the present day.—James Britten.

**BORRAGO.**—This word seems allied to, or derived from, the Latin and Greek Boreas—northerly. The Boraginaceæ are chiefly natives of the northern regions, and the herb *Borago officinalis* combined to form what is called a "cool tankard."—A. H.

**TESTACELLA.**—A gentleman who is engaged in studying the slug family is unable to procure specimens of *Testacella* in his own neighbourhood; he will feel greatly obliged if any of our readers, who may happen to reside in parts of the country where they are common, will send a few specimens addressed to C. Barron, Haslar, Gosport.

**CHENOPODIUM BONUS HENRICUS** (*SCIENCE-GOSSIP*, p. 189).—It is supposed that the Henry honouring this plant with his name is the sixth, known popularly as the good King Henry! From the circumstance that many of the vernacular names of our wild plants were given by the monks of the olden times, some have accounted for a designation, otherwise singular, since the aforesaid king was held in especial esteem by the spiritual dignitaries of his reign, for whom he founded Eton College.—J. R. S. C.

**MISLEADING LOCALITIES.**—A correspondent records in last month's *SCIENCE-GOSSIP* a disappointment he incurred when searching for a plant in a spot where it was reported to occur abundantly. I suspect a good number of persons are yearly put to disappointment and needless expense through the fact that in books long lists of localities for plants and insects are given which were either fictitious in the first instance, or are now valueless because the species has died out. One can hardly expect the compiler of a book to ascertain for himself the correctness of such references in all cases, yet there has been too much careless copying from doubtful authorities.—J. R. S. Clifford, 59, Robert Street, Chelsea.

**PAO D'ARCO.**—The tree known as the Pao d'Arco is a species of *Bignonia*. There are a great many kinds of plants belonging to this genus; some of them, most ornamental climbers, lovely to look at in this country, but still more so in their native forests; at least so a gentleman who has been out in the Brazils informs me. The red paint called *chica*, and which is used by the natives of the Orinoco to stain their bodies, is made from one of the *Bignonia*.—Helen E. Watney.



**HAWKEN'S KING OF THE HERRINGS.**—Mr. William Borlase, of Castle Horneck, near Perzance, writes to the *Cornish Telegraph*, that on the walls of a cottage in the neighbourhood, has been discovered the drawing of a very remarkable fish, captured in Mount's Bay at the close of the last century. Under the picture is the following inscription:—"Hawken's Gymnotrus; the Ceil Conin, or King of the Herrings. This very remarkable fish came on shore (alive) at Newlyn, on Saturday, February 23rd, 1788. Its length, without the tail (which it wanted), was eight feet and a half. Its breadth ten inches and a half; thickness two inches and three quarters; and weight forty pounds."

**BEES AS BOTANISTS** (SCIENCE-GOSSIP, 1869, p. 272; 1870, p. 188).—I am glad that Mr. Spicer has again drawn attention to the subject of the discrimination of plants by bees. My friend Mr. Holland was, I believe, the first to observe that bees while collecting confined themselves mainly, if not entirely, to plants of the same genus, species, or order; and Mr. John Duncan, late of Kew, made a series of observations which tended to establish the same fact. He informed me that it was more especially while collecting nectar that he had noticed their careful selection of plants of the same species, and mentioned, as an instance, that a bee, after visiting a foxglove at one end of the rockwork in Kew Gardens, passed by all the other flowers, until it arrived at one at the other end. When collecting pollen, however, they are not so particular, so far as species are concerned; but even then, so far as my experience goes, they confine themselves to allied plants. Since Mr. Spicer's note was published I amused myself by watching a bee in a greenhouse, who devoted himself entirely to a species of *Campanula*, of which there were two plants. He repeatedly passed backwards and forwards between them, going over several flowers in his way, at some of which he paused for an instant as if in doubt, but then went on. A series of notes on this subject from different observers would be of considerable interest; but it must be noticed in each case, especially in those which go against this theory, whether the insect actually takes anything from the flower, or only pauses for inspection.—*James Britten, F.L.S.*

**ASPLENIUM RUTA-MURARIA** I have found on old walls near Hastings, but at Dovedale, which I have just visited, it is very plentiful in the crevices of the rocks.—*D. J. S.*

**MUSIC SHELLS.**—The popular name of "Music Shell" is not confined to one species; several of the genus *Conus* are marked with black spots on a white ground. In many cases these spots are pretty evenly distributed over the whole surface of the shell; but in some species they are arranged in bands round it; thus appearing like a number of chords in written music. From this appearance the shell receives its name. I am acquainted with two species thus marked, namely, the *Conus eburneus* of Ceylon, a shell about an inch and a half in length, and the *C. musicus*, a much smaller shell, which is, I believe, a native of the West Indies.—*A. J., M.A.*

**CONFERVÆ IN AQUARIA.**—I have had *Valisneria* growing in a glass jar, holding about two quarts, for nearly two years, during which time the water has never been changed, but filled up with New River water, to allow for evaporation, and have never been troubled with confervæ. I think the reason is that I keep it out of the direct sunshine.—*D. J. S.*

**TRAVELLER'S DELIGHT** (p. 188).—The *Clematis* is doubtless the plant referred to, more usually called "Traveller's Joy."—*G. H. H.*

**MUSIC SHELL** (p. 188).—Several shells are known by this name, for instance, *Voluta musica*, and several species of the genus *Harpa*.—*G. H. H.*

**QUERY ABOUT BEES.**—Bees do not always confine themselves to one species of plant when collecting nectar and pollen. Yesterday I watched four different bees on white clover and heather in the same flight. I watched them off the heather on to the white clover. I could have made no mistake, for I marked them while on the heather with powdered chalk, and did not lose sight of them; and to-day, 4th of August, I watched seven bees on mignonette poppies and common marigold. I marked the bees I expected to watch, while on the poppies, with chalk, and while on the marigold, with ochre.—*John McHine.*

**AMHERSTIA NOBILIS.**—Your correspondent, "H. G.," in the last number of SCIENCE-GOSSIP, asks, what has become of the plant of *Amherstia nobilis* that once existed in the Royal Gardens at Kew? This query I cannot answer. I am aware it first flowered in this country, in the then celebrated collection of Mrs. Lawrence, Ealing Park. A fine plant, I believe, exists at present in the princely establishment at Chatsworth, and in 1867 or 1868 cut blooms were exhibited at the meeting of the Royal Horticultural Society, South Kensington. Mr. Taplin, who then had charge of the plant, gave me a splendid cluster of its brilliant scarlet and yellow flowers; and if memory fails not I understood him to say that the roof of a plant stove was covered with this lovely exotic. Visitors to the Kew Museum of Economic Botany will notice a faithful drawing, by W. H. Fitch, Esq., F.L.S., on the staircase of No. 1. The plant belongs to the Leguminaceæ, or pea tribe, and is a native of India.—*F. W. Burlidge, The Knoll Gardens, Baildon, Leeds.*

**ELM TREES.**—At the inquest on the young man, who was recently killed in Windsor Park by the branch of an elm tree falling upon him, Mr. Menzies, the deputy-surveyor of Windsor forest, gave some interesting evidence. He said that the branch which had fallen was a living one, the tree being apparently in perfect health, but that during seasons of great heat and drought, branches of elm trees were exceedingly liable to fall without the slightest notice or warning, and green branches much more so than dead ones, even in the calmest weather. How is this explained?—*G. H. H.*

**YAFFEL.**—This word occurs in an extract from a book of poems reviewed in the *Athenæum*, Aug. 13.

"He knew  
Where grew the sundew, or the flowering fern,  
And marked the Yaffel laughing in the sun,  
Because the rain was coming."

To what plant is reference made?—*R. T., M. A.*

**HELIx NEMORALIS.**—At the entrance to Ballyshannon harbour there are very extensive sandbanks; on the summit of some of the highest may sometimes be found myriads of shells of this species, all of which have been forsaken by their tenants. I shall be glad to learn how they come in such vast numbers to these sand-hills. I should also mention that the water never reaches the eminence on which they occur, which is in many places sixty or seventy feet above the water-level. I send a couple of specimens, so that you may be satisfied of their identity.—*H. Allingham.*



## NOTICES TO CORRESPONDENTS.

ALL communications relative to advertisements, post-office orders, and orders for the supply of this Journal, should be addressed to the PUBLISHER. All contributions, books, and pamphlets for the EDITOR should be sent to 192, Piccadilly, London, W. To avoid disappointment, contributions should not be received later than the 15th of each month. *No notice whatever can be taken of communications which do not contain the name and address of the writer*, not necessarily for publication, if desired to be withheld. We do not undertake to answer any queries not specially connected with Natural History, in accordance with our acceptance of that term; nor can we answer queries which might be solved by the correspondent by an appeal to any elementary book on the subject. We are always prepared to accept queries of a critical nature, and to publish the replies, provided *some* of our readers, besides the querist, are likely to be interested in them. We do not undertake to return rejected manuscripts unless sufficient stamps are enclosed to cover the return postage. Neither can we promise to refer to or return any manuscript after one month from the date of its receipt. All microscopical drawings intended for publication should have annexed thereto the powers employed, or the extent of enlargement, indicated in diameters (thus:  $\times 320$  diameters). Communications intended for publication should be written on one side of the paper only, and all scientific names, and names of places and individuals, should be as legible as possible. Wherever scientific names or technicalities are employed, it is hoped that the common names will accompany them. Lists or tables are inadmissible under any circumstances. Those of the popular names of British plants and animals are retained and registered for publication when sufficiently complete for that purpose, in whatever form may then be decided upon. ADDRESS, NO. 192, PICCADILLY, LONDON, W.

R. B.—The common vine disease (*Oidium Tuckeri*). The application of sulphur is the only remedy.

H. B.—No printed list that we are aware of with popular and scientific names. Dr. Knaggs' cabinet list may be had of Van Voorst, at 1s. 6d. each.

E. W.—Both are the common *Pteris aquilina*.

H. S.—See our last volume for remarks on "Honey-dew." Dragon-flies do *not* sting. Rye's "Coleoptera," published by Lovell Reeve. Hymenoptera, only Smith's Catalogue, published by the British Museum. Diptera, no manual.

C. H. T.—Only Bentham's "Illustrated British Flora," in two volumes.

W. E. S.—Eggs of the Meadow Pipit.

D. J. S.—It would be useless to *guess* at the name of your organism from vague description.

W. L., Jun.—The *Canadian Entomologist* and the *American Entomologist* are supplied together for two and a half dollars a year. Address, Rev. C. J. S. Bethune, Credit, Ontario.

F. S.—We cannot name objects at random from descriptions.

A. E. O.—If you inquire, you will find that a good collection, preserved from the influence of light and dust, and available for study, is also included in the national collection.

R. W. B.—Whitish and cream-coloured varieties of the Sand Martin (*Cotyle riparia*) have been recorded.

AQUARIA.—"B. W." will see Mr. Small's self-emptying and cleansing aquaria in operation at the S.W. corner of the Workmen's Exhibition, Agricultural Hall, or at No. 13a, William Street, Camden Road, N.

W. E. H.—A species of *Isaria* (fungus) on dead pupa.

H. D.—Common leaf-galls, described and figured in a previous volume. Consult exchange list, or apply to Mr. Walter White, of Monmouth.

J. M. M.—Eggs and larva of Lacewing Fly (*Chrysopa*); see previous notices. The larva is called the "aphis lion."

T. P.—Some hundreds of species. Consult Blackwell's "Spiders of Great Britain."

C. F. T.—The moth is *Phlogophora meticulosa*.

W. L. H.—Nothing better than Westwood's "Introduction." "Manual of Botanic Terms," 2s. 6d. Hardwicke.

UNMOUNTED OBJECTS.—Mr. W. White, of Monmouth, supplies them upon very reasonable terms.

E. G. V.—It is the *Podosphaera clandestina* of the 2nd edit. of "Microscopic Fungi."

E. T. S.—*Stegonosporium cellulosum*.

H. A.—*Helix nemoralis*.

H. T.—No. 1. *Scabiosa succisa*. 2. *Parnassia palustris*. Leaves should be sent with flowers for identification.

S. W. B.—We should be glad to hear of a successful remedy for plant-lice.

H. F. P.—No. 6. *Bacidia luteola*, Ach. 8. *Endocarpon pusillum*, Hedw.

## EXCHANGES.

NOTICE.—Only one "Exchange" can be inserted at a time by the same individual. The maximum length (except for correspondents not residing in Great Britain) is *three* lines. Only objects of Natural History permitted. Notices must be legibly written, *in full*, as intended to be inserted.

WANTED, well-mounted slides in exchange for Lepidoptera, &c.—H. S., Norwood Lodge, Streatham, Surrey.

A. *Atropos*, B. *Quercus*, and other Lepidoptera for Sesia and other good species.—J. Purdue, Ridgeway, Plympton, Devon.

GRASSES.—*Phleum alpinum*, *Alopecurus alpinus*, and other Clova plants, for British grasses.—Lists to John Storrie, 264, Parliamentary Road, Glasgow.

*Osmunda regalis*, Fructification of.—C. P. Parkstone, Poole, Dorset.

BRITISH BIRDS, stuffed, and mounted in cases, in exchange for British Butterflies and Moths.—C. S. C., St. Helen's View, Hertford Street, Portsmouth.

HIGHLAND and other Scotch Plants in exchange for English or Irish ones.—Address, Richard McKay, 298, High Street, Glasgow.

MOSES.—*Pottia pallida* for rare British Seaweeds, Lichens, or Mosses.—E. M. Holmes, 2, Arundell Crescent, Plymouth.

SCALES of Salmon, Bass, Mackerel, and Hake.—Send stamped envelope, and object of interest, to J. R. P., Wedsbury Villa, Woolcott Park, Bristol.

OBLIQUE SECTION OF FERN.—Send stamped addressed envelope to W. White, Monmouth. Any material acceptable. Wanted rare foreign wood stems.

*Valisneria spiralis* in exchange for British Birds' Eggs or Lepidoptera.—W. Liversidge, Stansfield Row, Burley, Leeds.

*Chætophora elegans*, and *Oscillatoria autumnalis*, good slides, for slides or material. Send lists. A reply at once if accepted.—Rev. John Hanson, 1, Bagby Square, Woodhouse Lane, Leeds.

PUPÆ of *Callunæ*, *Carpini* and *Fuliginosa* in exchange for British Birds' Eggs.—Address, H. Duberly, Wolsingham Rectory, Darlington.

FERNS.—*Gymnogramma Peruviana*, *Pteris longifolia*, and other rare ferns (mounted) in exchange for mounted objects of interest.—C. Ward, Freehold Street, Coventry.

FOR scales of Prussian Carp and Perch (unmounted), send stamped directed envelope, or other microscopical material (unmounted) to J. Needham, 5, Circus Place, Finsbury Circus, E.C.

## BOOKS RECEIVED.

"The Medical Investigator." Nos. 81, 82. June, July, 1870. Chicago: C. S. Halsey.

"The Monthly Microscopical Journal." No. 20. August, 1870. London: Robert Hardwicke.

"The Journal of Applied Science." August, 1870.

"The Food Journal." August, 1870.

"The American Entomologist and Botanist." July, August, 1870. St. Louis: R. P. Studley & Co.

"The Gardener's Magazine." August, 1870.

"The Animal World." No. 11. August, 1870.

"Land and Water." Nos. 233, 234, 235, 236, 237, 238.

"The Canadian Entomologist." Vol. II. No. 8. July, 1870. Toronto: Copp, Clark, & Co.

"Le Naturaliste Canadien." July, 1870.

"The American Naturalist." August, 1870.

"The English Mechanic." Nos. 280, 281, 282, 283.

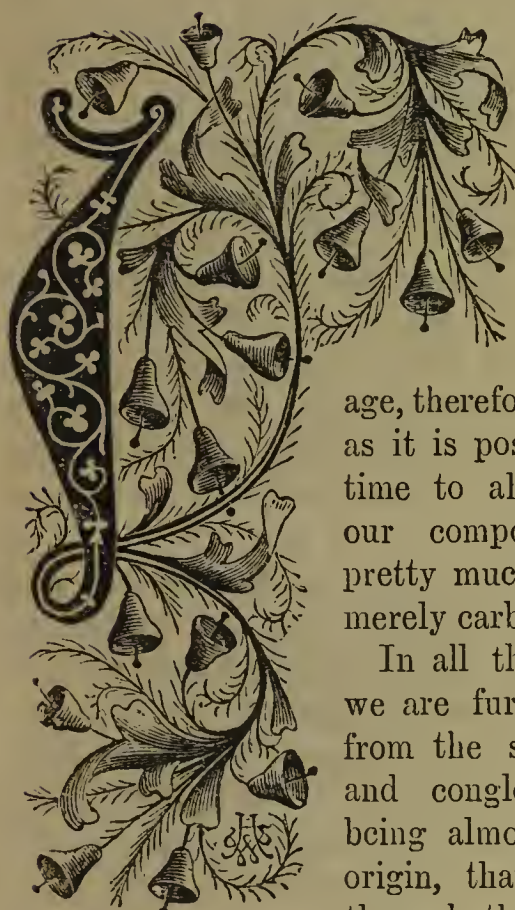
COMMUNICATIONS RECEIVED.—B. T.—F. W. B.—J. S. W. D.—H. B.—J. H. M.—E. W.—C. H. T.—J. McL.—A. J. D.—J. H.—C. F. W.—J. B.—H. E. W.—J. E. T.—J. R. S. C.—H. S.—R. B.—M. P.—A. H.—R. H.—E. S.—C. S. C.—D. J. S.—J. S.—R. W. B.—E. E. S.—G. H. H.—S. A. S.—C. F. T.—W. E. H.—H. R.—R. H.—C. P.—E. T. C.—F. N.—H. E. W.—M. J. T.—W. J. S.—J. P.—R. McK.—H. B.—A. E. O.—W. L., Jun.—F. S.—H. C. S.—A. E. B.—H. D.—H. R.—G. S.—F. J.—W. T. I.—W. W.—E. B.—J. R. P.—T. P.—E. M. H.—J. M. M.—A. S.—E. V.—E. G. V.—E. A. J.—J. H.—W. L. H.—A. F.—H. A.—W. G. G.—S. W. B.—H. D.—H. T.—A. J. M. A.—R. T., M. A.—S. B. P.





## THE STORY OF A PIECE OF LIMESTONE.

By J. E. TAYLOR, F.G.S.



I AM elected as spokesman for a common and well-known mineral, which is abundant in every geological formation. Our

age, therefore, varies as greatly as it is possible for mundane time to allow. Chemically, our composition is always pretty much the same, being merely carbonate of lime.

In all the rock formations we are further distinguished from the sandstones, shales, and conglomerates, by our being almost wholly of *vital* origin, that is, manipulated through the agency of living

forms. Whereas the other rocks I have mentioned are the result of *mechanical* forces, wearing down and triturating pre-existing rocks, and then re-depositing the *débris* along old sea-bottoms. In consequence of this difference, the geologist finds in us by far the greater number of those organic remains, especially of marine animals, by whose aid he is enabled to sketch forth the development of the world's great life-plan.

As a rule, all limestones have been deposited, as fine calcareous ooze, away out in deeper water; consequently the circumstances have been doubly favourable for the preservation of any animals which might have died and become entombed in this limy mud.

The more boisterous conditions which prevailed in the shallower waters, where coarse sands and conglomerates were formed, prohibited such favourable preservation. At the same time, with the exception of what are known as freshwater limestones (which bear a very small per-centage to the other rocks of

the earth's crust), I must acknowledge that the sandstones afford most valuable evidence of the *terrestrial* animals. This, as might be expected, is mainly owing to the fact that the latter were formed nearer to the shore, so that carcasses of land animals accidentally drowned or carried into the sea by rivers watering large islands or continents where they lived, would sink to the bottom, and be buried up in coast deposits; whilst the sandstone and shale formations testify to the long-continued wear-and-tear of the solid land by meteorological agencies: therefore, the limestones bear out the idea of our planet's antiquity, by suggesting the immense lapse of time which must have occurred whilst simple and lowly animal functions were elaborating the greater proportion of all the limestone rocks.

But I intend to let each of these speak for itself. They are of age, ask them! Each contains its own suite of organic remains, the extinct creatures which lived and died whilst the limestone mass was slowly accumulating as calcareous ooze. They are tombs of the forgotten dead—stony scrolls, written within and without!

I myself belong to that most interesting geological formation known as the Silurian. Away in the heart of the "Black Country," where no less than thirty feet of solid coal abuts against their flanks, you may see cropping up an irregular and continuous ridge of limestone hills. It is thence I am derived. You may gather some idea of the forces which slowly upheaved these strata by seeing the steep angle at which they lie: a little more and they would have been quite perpendicular. But this upheaval was not violent or sudden; on the contrary, I distinctly remember its operating through long-continued ages subsequent to the Silurian period. The process was so slow as to be almost imperceptible, for Nature knows little or nothing of those violent cataclysms which have been so foolishly ascribed to her! Examine the steep flanks of the Wren's Nest, near Dudley. There is



hardly a space of a pin's point which is not occupied by the remains of some creature in which the breath of life was enjoyed countless millions of years ago!

You strike the solid rock with your hammer, and immediately the percussion liberates a heavy sulphuretted odour, which tells of the old animal gases in which the limestone is steeped. The very hardness of these rocks is more or less indebted to the same organic cause. I am told that when sculptors, nowadays, wish to harden their plaster of Paris casts, they do so by boiling them in oil. The principle is the same with most limestone rocks of every age. They are steeped, saturated in animal oils; nay, in many places across the Atlantic, where these old Silurian limestones and shales lie so deep down as to be within the action of the earth's internal heat, these oils have been distilled out of the rocks, and have followed the ordinary habits of fluids. It is by sinking through the overlying masses that these oil-springs are reached, and the valued liquor comes bubbling to the surface. Well does it deserve its common name of *Petroleum*—"rock-oil."

But few people imagine, when its brilliant light is illuminating their comfortable homes, that they are indebted to distilled *Trilobites* for the luxury! Here is another form of that grand law of correlation of physical force. The ancient Silurian sunlight furnished the means of vitality to the creatures which then enjoyed life. It was stored up in their tissues, and given forth in their buoyant gambols and locomotive powers. And when they died, what remained in their diminutive bodies decomposed, passed into other chemical forms, was preserved until our own day, when men unlock this ancient sunlight from its oleaginous condition, and turn it to direct heating and lighting account! Fancy sunlight bottled up in form of trilobites and mollusca! No wonder these should present such stony and petrified appearances, when all the animal oils have been so completely drained out of them.

How long these Wenlock limestones (for that is the name by which this section of the Silurian formation is known),—how long, I say, it is since these limestones were upheaved and exposed to the action of the weather, I cannot say. Their hardness, I have already mentioned, is most intense; but the wear-and-tear of the atmosphere has been such as to cause the fossils to stand out in relief; and a strange sight, therefore, is the exposed surface of a limestone slab. The eye is bewildered by the number and variety of organic remains, each standing forth from the fine limy mud in which it was originally enclosed. Little or no vegetation grows on this bare limestone surface; the latter is too impenetrable to yield a foothold; and so the geologist has it all to himself. Heads and tails of *Trilobites*, so plentifully dispersed that they immediately stamp the Silurian age of the rock, lie com-

mingled with brachiopodous shells, worm-tubes, sea-mats, chain-corals, and encrinite stems. You require no prompter to remind you of the exuberance of animal marine life in this distant epoch, and yet the Silurian period immediately succeeds the Cambrian, about which my distant relative, the Piece of Slate, gave you an account some time ago.

Whilst the limy mud—which subsequently became hardened into solid rock, and then upheaved into its present condition—was being slowly formed in deeper water, nearer to the shore there were deposits of a different nature going on: these consisted of muds poured into the sea by rivers, or wasted by tidal and current action from old coast-lines; gradually, therefore, the limy deposits passed into the muddy ones, so that the line of junction was almost imperceptible. Occasionally the fine mud was carried further seawards than usual, and then a thin layer of argillaceous matter was thrown down over the limy material. This accounts for the frequent alternations of limestone bands and argillaceous shales which you have doubtless seen in every section of Silurian strata.

At various epochs during the immensely long period which elapsed whilst these beds were forming, alterations of the sea-bottom took place; the area where limy deposits had been forming became shallow, so that clay or mud began to accumulate over the same spot; or, the sea-bottom became deeper, and, in that case, calcareous or limy material slowly formed where mud had previously been accumulating. Occasionally, perhaps, the sea became so shallow that shingle-beds were strewn over the area where both lime and mud had been collecting. My hearers can readily understand operations like these; they are still going on over various parts of the earth's surface; but the time of observation has not been extensive enough to see what they can effect. Only that simple element of time is required—and our planet is changed as by the will of some powerful magician! And, for my own part, I do not see why the timid, uncondemning spirit of modern times should begrudge *time* to the geologist, any more than they do *distance* to the astronomer!

The various strata which vertically succeed each other in the Silurian formation plainly indicate the geographical changes which affected these ancient seas; and, at the same time, imply the vast lapse of time during which they were brought about. Suffice it to say, this Silurian formation, with its enclosed strata, attains a total thickness of no less than twenty-six thousand feet!

Leaving my junior brethren to speak for themselves when their turn comes, let me try and remember some of the physical circumstances which marked the epoch of my own birth. First of all, what a different geography marked the surface of the globe then to what there is at present! I



believe there was a much wider extension of sea then than there is even now, when it extends over more than two-thirds of the earth's surface; and, owing to there having been fewer disturbances at that time than there have accumulated in subsequent periods, the sea was more equable in depth; whilst, at the same time, the dry land was less distinguished for mountain-chains. In consequence of the equable depth (or nearly so) of the sea, and of the similar climature which the entire surface of the world enjoyed alike, there was less difference in the animals and plants of various geographical zones; but this principle was in existence, although nothing like so broadly developed as at present.

The Silurian limestones of America, Asia, and Europe differ very little in their general *facies* of organic remains. You have no difficulty in recognizing the old features which struck you when examining the Dudley strata; but when more minutely studied, the naturalist makes out certain "colonies," caused doubtless by difference of geographical circumstances. As the time passed away during which the great sequence of beds belonging to the Silurian formation were being elaborated, other changes took place in organic life. The most marked feature was that of a progression from lower to higher types. Species multiplied, and the general *facies* of life became more varied and less cosmopolitan.

The lowest beds of my parent formation go by the name of Llandeilo Flags, so named from the locality in North Wales where the typical section may be studied. They are, as their name implies, strata of flaggy sandstone, much worked for commercial purposes. There is a considerable quantity of limy matter in their composition, and this gives them a peculiar durability. Interstratified with the beds of this deposit are immense layers of ancient volcanic matter,—basalts or tuffs: these flowed over the old sea-bottoms, when ejected from submarine volcanoes, or volcanoes situated near to the coast, as we find they usually are nowadays. The ashes or tuffs were carried by the winds, and the ancient seas had their surfaces thickly strewn with cinders for hundreds of miles; these sank to the bottom, and alternated with the regular shore deposits. Succeeding these Llandeilo Flags, we have another division, known as the Bala Limestone, also named from a locality: it has interstratified with it beds of sandstone, slates, and volcanic rocks again, which were doubtless strewn over the old sea-bottoms just like those already mentioned. The Caradoc Sandstones, named from their locality in Shropshire, containing also shelly sandstones, with soft shales and conglomerates, lie above the Bala Limestone, and complete what geologists have termed the "Lower Silurian Rocks." They differ, as a whole, in Great Britain, from their comprehending such a huge bulk of strata of igneous

or volcanic origin. In some places these are actually thicker than the rocks of sedimentary origin. What a stormy, restless epoch was that! The old sea-bottom was subjected to shocks and volcanic overflow more intense than those in the neighbourhood of Iceland, where the Skaptar-jokul is quivering with suppressed rage and superfluous power! Then, again, these Lower Silurian rocks have neither so abundant, nor so highly organized a fauna as the rocks of later date.

Let me mention the next in order, before I give you my personal recollections of the extinct creatures you find imbedded in these rocks as fossils. The "Middle Silurian" strata commence with the Llandovery slates (another localism); after which you have the May Hill sandstones (about which not a few geologists quarrelled some years ago) and the Taranon shales; altogether, this series is about two thousand feet in thickness, the Lower Silurian beds I have described being upwards of nineteen thousand feet thick. Next come the uppermost beds (to which I personally belong), known as the "Upper Silurians," and which attain a total vertical thickness of nearly five thousand feet. They include several deposits of minor importance; such as the Woolhope beds, and the Wenlock limestones and shales, completing what is known as the "Wenlock Group." Then succeed the Ludlow beds, of Aymestry limestones, and the Downton sandstones, in the latter of which is found a bed composed of scarcely anything else but the bones, teeth, and scales of small fishes, belonging to the placoid and ganoid orders. It is in these soft shales you find the fossils so well preserved. The shells, although they have been extinct for unknown millions of years, still retain their beautiful iridescent nacre, which, however, soon decomposes by atmospherical influence.

So much for the "stratigraphy" of this most interesting geological formation! At the forms of life which swarmed the seas of this distant epoch I cannot do more than merely glance. I have mentioned that, generally speaking, there was a progression. This is true only of the advance in the main, for, during the earlier portions of the Silurian period, huge *Orthoceratites* abounded, and these are among the highest classes of the mollusca. The muddy sea-bottoms swarmed with "sea-pens," now known as *Graptolites*. But, of all forms of life, those of the Trilobite family were most abundant. Several hundred species are known to belong to the Silurian formation alone. They were crustaceans of that family to which the lobsters and crabs of the present day belong, and which has always been noted for its aberrant types. Like other crustacea, they underwent metamorphoses and changes. So well do the old rocks tell their story of ancient life, that the geologist has traced the metamorphoses of Trilobites through



no less than twenty different stages, from the egg to the adult animal. In the last condition its body was enclosed in tri-lobed joints, which served as a defence, and at the same time were flexible enough to be adjusted to all the motions of their possessor. In fact, they served all the purposes of an ancient coat of mail. These various species of Trilobites literally swarmed in every sea of the Silurian period. There were species alike peculiar to deep water and to shallow, and the rocks formed under these different conditions (as I have above related) indicate which these species were. Well do I remember them crawling over the oozy sea-bottom, gorging the mud, as I am told earthworms now do, for the sake of the animalculous matter dispersed through it. When any danger approached, they coiled themselves up like modern wood-lice, and, in this state, you may not unfrequently find them fossilized. When the adult animal moulted, he did so at the junction of the head and carapace; and this accounts for the myriads of detached heads and tails found in every piece of Silurian limestone or shale. The Trilobite had compound eyes, arranged on sessile, half-round stalks, in which they were set like so many mounted jewels. Some species had not less than four hundred of these distinct facets. Thus we find the structure of this little creature completely setting all those wild theories at defiance in which some people have indulged. Their eyes indicate a similar constitution of the atmosphere then to what it is now, for the passage and refraction of the rays of light. And this fact is supplemented by the sun-cracks, rain-drops, &c., which pit the sandstones, telling of meteorological action identical in its operation with the present. Indeed, all the facts go to prove that even at this distant epoch of the world's history, the light of the sun and the atmosphere of the earth were exactly like what they are at present.

During the period of the "Middle Silurian" there was a great change in physical geography. How long a time had elapsed since the Lower Silurian strata had been formed, with their enclosed great sheets of volcanic lava and ash, may be guessed at from the fact that the May Hill conglomerates are composed of the waste fragments of the former; they had therefore been solidified into such rock as you now see them, and been uplifted from the sea-bottom into coast sections, and it was from their wear-and-tear when in the latter condition that the May Hill conglomerates were formed. Thus does the very structure of many of these deposits indicate the immense amount of time which elapsed during their elaboration. It was during the deposition of the "Upper Silurian" beds, however, that life was most prolific—was most varied. The sea was aglow with huge coral reefs, around which swarmed sea-lilies, star-fish, mollusea of innumerable species, nautili, orthocerata (of whimsical and

various shapes), and trilobites. The scene was most busy and most animated; the compound corals shone in various colours, and the adjacent sea-bottom was literally a submarine forest of erinoids, or sea-lilies. How abundant these lovely creatures were you may guess from the fact that you can scarcely pick up a fragment of Upper Silurian limestone without perceiving some of their detached ossicles, or jointed plates. In and out of these waving forests, with the arms of the animals representing branches, the innumerable species of trilobites swam, and crawled, and climbed. Every now and then some brightly coloured *pecten* flittered by like a butterfly. Univalves (*Murchisonia* and *Euomphalus*) of delicate oration and colour, slowly dragged their pretty shells about; the *Cystideans*, with their dwarfed stalks, but highly ornamented and sculptured heads, dotted the sea-bottom. Over all the occasional long arms of star-fish wound and unwound; the delicately beautiful nautilus, of various species, sometimes walked, sometimes filled its air-tube, and mounted to the surface. The whole of Wenlock Edge, in Shropshire, is nothing less than an ancient Silurian coral reef, around which, millions of years ago, all the vital circumstances I have been attempting to describe took place! Of all these beautiful coral forms none were so lovely as the "Chain-coral" (*Halysites catenulatus*). Well does it deserve its name, for even now it appears like some watch-chain of exquisite workmanship interfolded in the solid rock! The largest of these corals was the *Favosites polymorpha*. Amidst all should not be forgotten the nests, groups, or even banks of *Terebratula*, *Atrypa*, *Rhynchonella*, *Spirifera*, *Producta*, *Strophomena*, and *Pentamerus*; all of them belonging to the lowest class of mollusca, then in luxuriant abundance, now waning into extinction. Towards the close of the Upper Silurian period, *Vertebrata*, in the form of fishes, made their appearance: at first they were few in number and small in size; but ere long they multiplied amazingly. They had their old feeding and breeding grounds, and along this part of the old sea-bottom their remains were of course most thickly accumulated. Such is the explanation of the Ludlow bone-bed. I am told that off the western coast of Ireland, near Rockall, such a bone-bed is now actually in course of formation; so that if it becomes covered over by succeeding deposits, it may one day present a similar appearance. Of the land plants of this period I cannot say much; but that the dry land was more or less clad with green, I have not the slightest doubt. What makes me feel so confident about this is that the small spores of club-mosses are to be found fossilized in the "bone-bed" I have mentioned. You can only see them with the microscope, but there is no doubt as to what they really are. These spores must have been carried by the land-breezes sea-



wards, and strewn over the surface of the ocean until they sank, and were buried in the deposits accumulating along the bottom, where the bony-scaled and shagreen-skinned little fishes were living, breeding, and dying.

My story is now finished, for the formation of cracks and fissures in our solid rocks belongs to a later time. Of the minerals and metals which were segregated along the walls of these fissures until the latter became "metal lodes," I cannot say; but thus much—that, apart from the numerous fossils contained in us, our rocks will always be esteemed interesting to man, seeing that it is in them that gold is most abundant.

### ON DIMORPHISM, OR THE OCCURRENCE OF DIFFERENT FORMS IN CERTAIN PLANTS.

BY F. I. WARNER.\*

IN studying any branch of natural history it is exceedingly interesting to notice the various contrivances by which the same general law is applied to particular cases. Nature is in her laws uniform and consistent, however modified those laws may be in some instances, and however varied their mode of application. It has been enunciated by Mr. Darwin, and is, I believe, very generally held by naturalists and physiologists, as a maxim or general law, that nature abhors perpetual self-fertilization, and that with all organized beings distinct individuals must at least occasionally inter-cross. That this is an universal law in the animal kingdom no one doubts; its application, however, to the vegetable kingdom is not so generally known or held. No one, however, acquainted with the researches of Darwin, Gärtner, Sprengel, and others, who have given the subject their attention, can refuse his assent to its being of at all events very general application.

The contrivances by which the intercrossing of distinct individuals is insured in the case of plants are very various, and many of them excessively beautiful. One of these contrivances is that by which a species is separated into two or more forms differing in the structure and function of the pistils and stamens, and each form depending on another form for complete fertilization. This has been designated by Mr. Darwin, who was the first to point out its meaning, *reciprocal Dimorphism*.

If a number of primroses or cowslips be gathered, even from the same bank, and growing side by side, two distinct forms will be found nearly equally distributed amongst the flowers; some will have the pistil appearing just inside the throat of the

corolla, the stamens being out of sight about half-way down the tube; the others will have the stamens appearing, being attached by their very short filaments just within the mouth of the tube, while the pistil is out of sight, occupying the position of the anthers in the other form. This difference in form, or *dimorphism*, is a very general characteristic of the sexual organs in the different species of *Primula*, and occurs also in several other genera of the same order, and is well-known to polyanthus and auricula fanciers, who designate the long-styled forms "pin-centres" or "pin-eyed," and the short-styled forms, "rose-centres" or "thumb-eyed."

The two forms differ in other respects: the expansion in the tube of the corolla is much longer in the long-styled than in the short-styled form, owing to the difference in the position of the anthers. The stigma in the long-styled flowers is always more or less globular and very rough, whereas in the short-styled flowers the stigma is nearly always flattened or depressed on its summit, and much smoother. The pollen-grains in the long-styled form are smaller and more oblong than in the short-styled. The difference in position of the anthers might, at first sight, appear to arise from, or to be connected with, the fact, that in plants belonging to the Primrose family, there is a suppression of a whorl of stamens, or at all events of some kind of floral leaves. That this is the case is seen from the stamens in plants of this order being opposite to the petals or lobes of the corolla, and not alternate, as in other flowers; and it might be imagined that in the long-styled form a whorl of long stamens, and in the short-styled form a whorl of short stamens had been suppressed. This, however, if true, does not explain the fact that in *both* the existing forms the stamens are opposite, nor does it explain the difference in length of the pistil.

In addition to the structural differences I have mentioned, there are very remarkable functional differences between the two forms. The first person who pointed out these was Mr. Darwin, whose experiments are most interesting, and fully confirmed by those of subsequent observers; among other experiments he covered up with net six short-styled and eighteen long-styled cowslips, and found that the former produced from twenty-four umbels of flowers,  $1\frac{3}{10}$  grains of seed, or fifty seeds; and the latter from seventy-four umbels not a single seed. Judging from plants growing in the same bed and unprotected from insects, the six short-styled plants ought to have produced ninety-two grains weight of seed instead of only  $1\frac{3}{10}$ , and the eighteen long-styled plants instead of not one seed should have produced two hundred grains weight. These and similar experiments prove that the visits of insects are necessary to the fertilization of the different species of *Primula*, all being more or less sterile when protected from such visits. Further experi-

\* Paper read before the Winchester and Hampshire Scientific and Literary Society, June, 1870.



ments show that in order to insure complete fertilization the two forms must be intercrossed, pollen from the anthers of the long-styled form being applied to the stigma in the short-styled form, and *vice versa*: thus out of one hundred flowers of cowslips fertilized by pollen from the same form, the average weight of seed proved to be eleven grains; whereas one hundred flowers fertilized with pollen from the *other* form produced thirty-nine grains weight of seed, or more than three times as much.

Further experiments on the fertility and permanency of the offspring of these different unions reveal the remarkable fact that the offspring of the union of two plants of the *same* form are, to all intents and purposes, *hybrids* formed within the limits of one and the same species; so that in the species of *Primula*, although the flowers are structurally hermaphrodite, or presenting both sexes, they are in reality dioecious or unisexual.

That the species may eventually become completely dioecious, and that this dimorphic condition in the sexual organs may be a step towards this end, does not seem improbable. Many botanists consider that there is a tendency in all plants towards a separation of the sexes; and the fact that several plants, normally dioecious, present occasionally bisexual flowers, and more frequently flowers in which the pistils or stamens, instead of being entirely suppressed, are merely aborted or rendered rudimentary, seems to me to afford a strong argument in favour of such a view; and I do not see much difficulty in the belief that the stamens in one form, and the pistil in the other form of the different species belonging to the Primrose family, will eventually become suppressed, and the sexes completely separated.

But this, and the no less interesting question as to the form or forms from which our primroses and cowslips have sprung, are rather beyond the scope of this paper. It is evident that whatever advantage there is in a separation of the sexes, and intercrossing of individuals, is, at least, partially gained by this dimorphism and cross-fertilization of the two forms.

Dimorphism is by no means confined to plants of the Primrose family. Several species of *Linum* also present two forms. In *Linum grandiflorum* the difference is confined to the pistils, which are shorter and more divergent in one form than in the other. In *Linum perenne* the long-styled plants have stamens only about half the length of those in the short-styled forms.

In this case, as in that of the Primrose, the forms must be crossed in order to insure fertility, the pollen-grains of both forms being as unable to effect fertilization when applied to the stigma of their own form, as if they had come from the anthers of a totally distinct species.

Several species of *Lythrum* are also dimorphic. Of the two species indigenous in England, *Lythrum hyssopifolium* is stated by Vaucher to be dimorphic; Darwin, however, is of the contrary opinion: the plant is not a common one, and I have never seen it. The other British species, *Lythrum Salicaria*, the common purple loosestrife, presents *three* distinct forms, each differing from the others in the length of the pistil, and each having two sets of stamens differing from each other in appearance and function. The styles in the three forms differ greatly in length. In the long-styled form the style is one-third longer than in the mid-styled, and more than three times as long as in the short-styled form, and corresponds in length to the longest stamens in the other two forms. In like manner the length of the style in the mid-styled form corresponds with the length of the long set of stamens in the long-styled, and the shorter stamen in the short-styled form, and the style in the short-styled form corresponds in length with the short stamens in each of the other two forms. There are also other minor differences in the three forms, in the colour of the filaments and pollen, and number and size of the seeds. In the long-styled form, the filaments and pollen are yellow; in the other two forms the long stamens have their filaments pink, and pollen green, the short ones being yellow. In all the forms the size of the pollen-grains from the long stamens slightly exceeds that from the short ones.

As in the dimorphic plants I have before mentioned, so in this trimorphic *Lythrum* very important and remarkable functional differences are added to the differences in structure, and it has been found by careful experiments, that for the full fertilization of each form it is necessary that the pistil should be acted upon by pollen from the stamens of corresponding length in one of the other two forms—in other words, the longest style is only fertilized by pollen from the longest stamens of one of the other two forms, the middle style from the middle stamens, and the short style from the short stamens. In all three forms the pistil is only very feebly, or not at all, acted upon by pollen from the same form; the greater the inequality in length between the pistil and the stamens the more completely sterile being the union between them.

For the fertilization of all the flowers I have mentioned, insect-agency is more or less absolutely necessary, and all are frequently visited by bees, moths, and other insects. It is easy to see that if a bee visits, for instance, the flowers of the purple loosestrife, the longest stamens rub against the abdomen and hind legs, as does the stigma in the long-styled forms, and so in all the forms the stigma comes into contact with just that part of the insect's body which is sure to be covered with the right kind of pollen for its fertilization.

No contrivance could be better adapted to insure



intercrossing than this of rendering the stigma of a flower unsusceptible of being acted on by the pollen from the stamens of the same flower, while it is perfectly fertile when acted on by the stamens of the same length as the style in another flower.

Assuming that we have to deal with a flower so as to render it fertilizable only by pollen from another flower, in the first place, the stigma must be rendered *unfertilizable* by pollen from its own stamens, the stamens there not being required to be in juxtaposition with the pistil, must be moved out of the way of insects who may visit the flower for the sake of its nectar,—and lastly, suitable pollen must be provided in *another* flower of the same species, in such a position that it is certain to be brought into contact with the pistil we wish to act upon.

All this is precisely what is done in the case of these dimorphic and trimorphic flowers. A more beautiful instance of design is not, I believe, to be found in all the kingdom of Nature.

Many other dimorphic plants have been described, and many more doubtless remain to be discovered. Those I have mentioned are the best-known cases, and the ones which have been most carefully and thoroughly investigated. Moreover, the plants are all very common, and any one interested in the subject, and who has time and patience to do so, can easily examine specimens and make experiments for himself. The whole subject of the fertilization of plants is an extremely interesting one, and any new discovery, even the apparently most trivial, can scarcely fail of having important relations to some of the great questions of the day, as to hybridism and the origin of species.

#### “THE VIPER SWALLOWING ITS YOUNG.”

READERS of *Land and Water* are aware that for years past the question has been discussed in these columns and elsewhere, whether or not the old viper swallows her young to shelter them from approaching danger. More than one credible witness has stoutly maintained that he has seen the little vipers enter their mother's mouth, and a great many more have stated that they knew some one else who said he had. Certain it is, that the assertion has obtained a considerable amount of popular credence, in spite of the contrary opinion of many good naturalists that the act is almost physically impossible. Specimens of vipers have from time to time been sent to Mr. Buckland and others in support of the wide-spread belief referred to; but, somehow or another, every one of them has assisted to prove it to be a fallacy and illusion. Many have, it is true, contained young ones; but they have always been—not in the stomach—but in the receptacle where unborn progeny might be expected to be found; and when the mother has been killed or

injured by violence, they have escaped from the natural orifice, and not from the mouth. Mr. Buckland describes, in *Land and Water*, vol. viii. p. 202, an interesting dissection which we made together of a slow-worm full of young ones, and he there repeated his offer of a guinea to any person who will send him a viper that has been seen to swallow its young—a string to be tied tightly round the neck to prevent their exit.

I received to-day, by South-Western Railway, a small box labelled—

“Sceing is believing!!! Viper killed with live young in *stomach*!!! Killed this morning, 18th of August, 1870.” It was accompanied by the following letter:—

“MY DEAR SIR,—I have had a viper sent me to-day, said to be full of young live vipers; the man who killed it cannot positively swear that he saw the young vipers crawl down their parent's throat, but he followed the viper into a hole, dug it out and killed it. He then saw the young vipers endeavouring to crawl out of the mouth, so he tied its throat; and in this state I send it to you, having heard you express your incredulity of the popular opinion of the viper swallowing its young, that you may yourself test the fact in this instance, and report whether or no the young vipers are really in the stomach or not—if they are in the stomach the parent must have swallowed them. Your examination of the specimen will, I trust, help to settle this too often disputed point in natural history. — W. PENNEY (Poole, Aug. 18).”

“At last,” thought I, “the question is to be solved. Young vipers seen endeavouring to crawl out of their mother's mouth; stopped in the act; and imprisoned in the œsophagus by a ligature tied tightly round the throat of the old one. Nothing can be more complete! As Buckland is in the north, attending to his duties as Commissioner of Scotch Fisheries, I cannot consult him. It will never do for me to dissect this viper by myself. If I find young ones in the *stomach*, the naturalists will declare either that they were placed there as a hoax, or that I did not know the stomach from the uterus; and if I find the babies where they ought to be, the true believers in the swallowing theory will not even ‘concede against their will,’ but in all probability ‘will be of the same opinion still.’”

So, having an appointment with my friend, J. K. Lord, at the office of *Land and Water*, I took the treasure with me, that we might carefully dissect it together. On opening the box, I found a fine female viper measuring 25 in. in length; the stomach slightly distended, and the throat tied round tightly with string close to the head. Severing this ligature, and controlling my own impatience and that of my colleague, I carefully made an incision with knife and scissors through the outer skin along the



belly from head to vent, without puncturing the inner membrane, turning back and pinning out the skin as I went on. The immediate result of this portion of the operation was to elicit from a member of the staff seated at a neighbouring desk, a sound between a sigh and a groan; in fact, a prolonged "phoof-f-f-f-f." Well, I confess that an unpleasant odour did pervade the room, but, absorbed in the interest of the operation, my companion and I hardly perceived it. Now, for the young vipers! I opened the stomach, and a little way down came upon something not exactly coiled up, but lying in a graceful serpentine double curve. "By George, Lord," I exclaimed, "here is one!" "Looks like it, certainly," he replied. The stench by this time had become—to use a mild expression—intrusive, and the before-mentioned member of the staff remonstrative. "I say, you fellows," roared he, "this is *too* strong; I never before wished I had a cold; but I would welcome the catarrh which would render my nostrils impervious to this stink. Open the windows." Undisturbed by the inconsiderate interruption of our friend, we tranquilly pursued our work. I endeavoured gently to withdraw the supposed young viper. No! it would not move; possibly it was entangled with many others, for there was a firm dark mass further on. I laid open the remainder of the stomach, and took from it, not a Laocoon-like coil of snakes, but a half-digested mouse, and found that the supposed young viper was *the mouse's tail*! There were no young vipers either in the stomach or the uterus, and therefore, if the finder saw anything protruding from the viper's mouth, it was this little caudal imitation of a young snake. One thing is certain, that the mouse was not alive when the viper was taken, for it was almost digested; otherwise one might have thought it possible that the poor little beast had been seen in the act of waving a farewell to the world by a final wag of its tail; and, therefore, if this appendage were seen at all by the captor, it must have been partially vomited and re-swallowed by the viper.

Thereby hung a tail! *Parturit viperus; nascitur ridiculus mus*. So much for this fresh "*proof positive*" of the viper swallowing its young.

HENRY LEE, in "*Land and Water*."

#### "KILLING NO MURDER."

IN a periodical (which has now, I believe, ceased to exist) a rather remarkable discussion was carried on in the years 1868-69, on the grave question "Do insects feel pain?" This, at least, was the point at which the discussion started, though it was soon apparent that the debate extended over a wider space—that is, if insects feel pain, it would follow also that they had pleasurable sensations—and from the subject of feeling generally, the debaters

soon passed to the consideration of instinct, reason, and memory, as these show themselves, or are thought to do so, in the realms of insect life.

This semi-scientific controversy dragged its slow length along for many months, eliciting a certain amount of truth, in fact and argument, though it may be doubted whether any of the disputants on either side were materially influenced by the logic or rhetoric of their antagonists; for we know that if you—

"Convince a man against his will,  
He holds the same opinion still."

The living beings most directly concerned in the controversy, had, as was unavoidable, no opportunity of appearing "in person" or "by counsel"; and though a statement of great brevity on their part might have settled the question speedily, and rendered needless a vast consumption of quarto and foolscap; such, under the circumstances, could not be had. Indeed, the aspect of the business, as far as the insects were concerned, was sufficiently unpromising, and reminded one of the old joke passed upon the aristocrats by the sans culottes in the days of the French Revolution:—"Gentlemen, you have got to be shaved—there's no doubt about *that*—but if you wriggle too much you will get cut." So it might have been said to the insects by their admirers and collectors, "You have got to be captured and killed; if you don't feel it, and therefore don't mind it, well and good; if you can feel, why—we must kill you all the same."

The cabinet drawers wait expectantly; there are gaps which need to be filled up, and "series" which cry for completion. Had, therefore, the question of "pain" or "no pain" been solved by the proving of the former, we are of opinion that the bulk of entomologists would have gone on the even tenour of their way, in spite of the fact.

To wade through such a discussion now would be unprofitable in the extreme to most persons; yet now that all acrimony may be supposed to have disappeared, or, by a process of mental decomposition, changed itself into that amiability which is so happily common amongst entomologists and naturalists generally—I have ventured to run over the whole, and without attempting to gather up the scattered threads of the various arguments, *pro* and *con*, I have gleaned a few "crumbs of comfort" (to borrow an expression from one of our Puritan divines), which may be acceptable to those engaged, in some way or other, in the study of insects; and who are therefore compelled to kill them occasionally, or, it may be, frequently.

Opinions and vague assertions must be disregarded in this hasty glance at a few of the facts brought forward; and though I select those only which were adduced by the advocates of what I take to be the most philosophical theory: that they *are* facts—my own observations of insect doings and



insect habits lead me to believe; and whatever may have been advanced on the other side, does not in the least invalidate or set aside these.

Nothing is more common, even now, than the accusation of cruelty; and it is heard on the lips of otherwise intelligent people. When the entomologist attempts to show that insects have little or no feeling, he is at once charged with "making the wish the father to the thought"; and his opponents shake their heads or lift their eyebrows, as seriously as if they were absolute vegetarians, and innocent of all participation in the taking of animal life. The very trite Shakespearian utterance about the beetle and the giant is always handy; though it has been shown very conclusively that its meaning, when rightly understood, runs just counter to the sense in which it is quoted by those who desire to rouse a pseudo-sympathy for insects and similarly organized beings.

"What great events from little causes spring!" A long controversy was set a-going by a brief and very mild letter, from a certain "Entomologicus," who called attention to the three theories held regarding the sensations experienced by insects; viz., 1st, that they feel no pain; 2nd, that they feel pain acutely; 3rd, that they feel pain, but only in proportion to their size and precarious life. To the last he gave in his adhesion, as does also the writer, for though many circumstances in insect history tend apparently to show that insects have no feeling, yet we cannot but suppose that life in an animal differs from life in a plant, in this particular amongst others—that it has consciousness, and therefore is susceptible of what is (for want of a better designation) called pleasure and pain; for a moment's thought will show that these are only relative terms, and to a large extent, things of association, being dependent on the connection of mental impressions with bodily sensations. How, therefore, the latter by themselves may influence creatures which have not a moral and intellectual nature is unknown to us, and we speak of pleasure and pain amongst insects (and perhaps also amongst some larger animals), without knowing precisely what we mean—we are compelled to judge by appearances.

As it was remarked by a writer in this controversy, "we have no means of forming an opinion as to whether insects experience pain at all, except by observing their movements under certain conditions. From merely seeing these movements we cannot ascertain what may be the sensations which cause them. Our own feelings can be no criterion of theirs, seeing how essentially different the anatomy of insects is from that of mammalia, and, therefore, we have no starting-point which the two classes have in common, whereby to calculate what amount of feeling the former class has."

The following recently observed facts, or old

facts reset, therefore, do most decidedly favour the opinion that insects have comparatively little feeling, though its exact amount cannot be computed. We find no central brain, no concentration of nerve-matter, upon which, anatomists tell us, depend all the various sensations experienced by us, and the animals most resembling man. Insects have nerves scattered over their bodies, and united in certain knots or *ganglia*, yet from these no telegraphic indications are passed to or received at a central point, be it ever so small. That somewhere in the head of an insect resides a power of volition, whereby the movements of the body are directed, under ordinary circumstances, is most probable. In some way, other than by sight, a caterpillar or a moth, and most insects in fact, are aware of a touch, unless it be very gentle indeed. There is a circulating fluid in insects, which courses not along its channels to and from an ever-beating heart, as we find does the blood, which is emphatically "the life" in mammals and birds. This fluid creeps along, in most insects, rather in the manner of the juices of plants, as observed in their cells. Though it cannot be asserted, therefore, that by this medium no feeling is passed throughout the frame of an insect, we see clearly that it can be but slight.

Moreover, the readiness with which insects part with their limbs is remarkable. A "daddy-long-legs" (*Tipula*) shakes off a leg or two at a touch, and walks upon the window-pane thereafter with utter indifference. A dragon-fly will seize and attempt to bite a portion of its own abdomen, if it be placed in such a position that it can seize it. Wasps with the abdomen entirely removed, will regale themselves upon some sweet compound with as much satisfaction as before. If you remove both wings from a fly, without otherwise hurting it, it seems in no wise annoyed, otherwise than by the hindrance to its powers of flying. A beetle of a carnivorous kind, which had been killed (as was supposed) and duly placed in the cabinet, was found to have extricated itself from its fastening, and had attacked the carcase of a neighbour. And the struggles which we notice in our operations upon insects for the purpose of killing or securing them for the cabinet, evidently arise, chiefly, if not entirely, from the stoppage of their accustomed movements, to which they are impelled by instinct. Thus, a leopard moth, fastened down with a pin, was moving its body in all directions, and while endeavouring to escape, would have been said by some to be giving proof of being in great pain. Yet when the pin was withdrawn from the cork, the moth moved a short distance, and then settled down very quietly until evening, not being then apparently affected by the continuance of the pin in its body. So also moths, which have been detected in the daytime resting, with outstretched wings, on tree-trunks or palings, have had pins



passed through them, and remained unmoved until their particular hour for flight arrived. There is no question but that in these cases, the insects feel the presence of the pin, yet the sensation is not so acute as to cause uneasiness; and it is only the evening which rouses the creature's activity, and its desire to escape. A beetle, again, which had been immersed in hot water, and subsequently pinned out, revived, and, the pin being taken out, got all right again, lived for some time, and devoured dead flies, &c., with gusto.

Here let me add a fact which I have repeatedly observed. There are many caterpillars which may be roughly handled, and even *squeezed*, yet they will devour their food as usual, provided no vital injury be given. And those of some species, as for instance, that of the Poplar Hawk (*S. populi*), will grasp the leaf or twig on which they are resting with [such tenacity, and they cannot be forcibly removed without tearing the body from the legs; while, were such attempts to remove them painful, it seems natural to suppose that the insect would loose its hold, and allow itself to be withdrawn.

Multitudinous, too, are the perils which beset insect life. Were they endued with acute sensations, every field, as the plough passes along it, would exhibit its host of miserable and disabled wretches; nor could we walk along a woodland or garden path, without leaving behind us sad mementoes of our tread. The amateur might pause ere he slew hundreds of aphides on his favourite roses, for who can tell the aggregate of suffering he would be inflicting? Both philosophy and common sense unite in telling us that the nature of an insect's life, and its liability to a 'sudden' close, decidedly show that the sensibilities attendant upon it are few. So, also, may it be said of other classes of animals approximating the INSECTA in their structure and mode of existence; and though every true naturalist will avoid all needless destruction of life, none such need feel that in the operation of "killing," sometimes unavoidable, they are guilty of anything approximating to "murder."

J. R. S. CLIFFORD.

#### VARIATIONS IN SEED-LEAVES.

TWO very curious instances of variation in seedlings have just been communicated to me by Mr. Aitken, of Bacup, which differ somewhat from any that were mentioned, either by Mr. Kitchener or myself; or rather, perhaps, that, whereas Mr. Kitchener and I only hazarded a conjecture as to the causes of a multiplicity of cotyledons, Mr. Aitken, having watched the growth of his examples for some time, has made a very interesting and valuable series of observations upon them; and the facts he has noticed enable us, without any doubt,

I think, to trace out the cause of their variation. They are both sycamores, which tree seems to yield a greater number of monstrous seedlings than any other plant I have seen.

Mr. Aitken writes to me: "Some seven or eight years ago I noticed a seedling sycamore with three seed-leaves. This I kept under my eye, in order to observe the development of the leaves, which, to my surprise, grew in *threes* in a whorl. *The leading shoot continues to do this up to the present time*, and in no case have fewer leaves than three ever been produced. But this singularity only applies to the leading shoot; for the side shoots or branches, which of course are in threes, only produce two leaves at each joint, as in the ordinary way. I have noticed many seedlings of the sycamore with three seed-leaves, but this is the only one that has continued to carry leaves in triplets."

Mr. F. V. Paxton, in SCIENCE-GOSSIP (p. 139), mentions a seedling of sycamore with three equidistant cotyledons, and a plumule consisting of three leaves in a whorl. This, when it grew up, might prove to be exactly similar to the one now described, and it probably had a similar origin; but, as two of the leaves were partially united, it is *possible* the peculiarity may have arisen from the union of two imperfect embryos; at any rate, the division of the original cellular mass into three lobes at the earliest stage of its growth, would not seem to have been quite so complete as in Mr. Aitken's sycamore. As this plant has preserved the same triple method of growth for so many years, there would appear to be, in this case, some inherent threefold energy; and the inference is, that, in such a case, the three cotyledons were formed from the beginning, and were not the result of either chorisis or synophty. There do not seem to have been many cases recorded of the continuance of a triple growth, so it is reasonable to suppose that the formation of a "trifoliar phyton" is the least common way in which to account for the presence of three seed-leaves in an embryo.

It is not uncommon to find three leaves, instead of two, growing from one joint in *Fuchsia*, as also *Anagallis*, and in several other plants. I rather think that this peculiarity, also, is often confined to the central shoots; but I am not sure, and cannot now find one to examine. Whether this unusual growth arises from the same cause as in the sycamore that has been described, or whether they are cases of chorisis, or of exuberance of growth, we cannot always tell; but these, and such examples as the sycamore, lead us to strange speculations as to what may be the nature of that force which, in one case, causes a cellular mass to form only *one* cotyledon, and to have much of its after-growth arranged in threes, to be an Endogen; and, in another case to exert such an influence on a cellular mass that it divides into *two* cotyledons,



and has its floral organs arranged in fours or fives, and is an Exogen, and yet in exceptional cases deviates from the usual plan, and produces Exogens with parts, which, being arranged in triplets, appear to have some connection with the other class.

The other example Mr. Aitken describes as follows. "On the day after I saw you, I found a seedling sycamore with four cotyledonous leaves. This I took home with me to watch its growth, thinking there might be a possibility of its growing four leaves in a whorl; but this was not the case, but, instead, *two* shoots, or stems, sprang up from the seed-leaves simultaneously, forming two leaders (if I may call them so). Is not this latter one, truly, a vegetable Siamese twin?"

Here we have, undoubtedly, a clear case of a multiplicity of cotyledons being caused by the union of two embryos in one seed.

ROBERT HOLLAND.

#### THE TOWING-NET.

OUR brave but unfortunate neighbours, the French, have an old proverb "God sends the meat, but the Devil sends the cooks"; and as it is said to be with our bodily aliment, even so does it seem to be with our mental pabulum. The Spirit of Truth may inspire the writer, but the Father of Lies, the Author of confusion, steps into the book-manufactory, "*les diables sont déchaînés dans cette maison là,*" and the careful brain-work is all marred by the mechanics who convert it into the commercial article.

In poor Tom Hood's immortal ballad, we are told how the iron-clad virtue of the good St. Anthony was proof against all the emissaries of Satan, until at last one of them came as a true daughter of Eve, "and the good old Saint forgot his age." Had Beelzebub ever written for the press, and experienced the inevitable torments which ensue, he would have inveigled the patient recluse into scribbling "a paper," perhaps for a natural history publication (the saints of old are said to have been very familiar with the *epizoa*), and then have sent a printer's-devil to him with a proof-sheet; in less than two minutes St. Anthony's fire would have blazed out in bad language.

With a view to helping our junior readers to learn how to skim the sea, and to identify the common things which are almost certain to be taken in the towing-net during the autumn, I gave them last month a simple account of one of my own trips. I described briefly the creatures which I actually caught in one hour; I told them where to find fuller particulars concerning them; and, with no small amount of labour and care, I prepared twenty-one drawings to illustrate my story: and I had a notion,

if the tale of the towing-net proved welcome to the uninitiated for whom it was intended, of gossiping in the same style about "the dredge" and "the trawl" when their respective seasons came round; "*mais il faut que le diable s'en mêle.*" Woe is me! I corrected the press, I numbered and named each woodcut, but the sons of Sheitan must needs have their frolic; I had ventured to mention (p. 197) certain defects in the figures of Cydippe given in many works, and I presented an improved portrait of her with her mouth in the right place. Now here was a chance for them not to be missed; they jumped at it; banishing the *vera effigies* of the crystal sea-nymph to p. 201, there—oh insult to injury—they called her by the ugly name of a vile sea-slug, *Polycera Lessonii*, mentioned in the text thereabouts; while into the space in p. 197 they dabbed the likeness of the miserable gasteropod, and underneath it printed "Cydippe." By another misadventure, the letter *a*, fig. 176, which ought to have marked the buccal arms (the leaf-like expanded lips below the cross formed by the canals, *c, c*), has slipped down out of its place, and got entangled with the threadlike marginal tentacles which fringe the lower edge of the umbrella.

Any readers of SCIENCE-GOSSIP who preserve their copies, will, I trust, correct these *diableries* with a fine pen, instead of binding up a bundle of absurdities.

It is a misfortune to be thin-skinned; to write for the press one need be a Pachyderm: but we must not be too severe upon our typographic staff, we cannot do without them. Gentlemen, I bow to you. "*Quand on a besoin du Diable, on lui dit, Monsieur.*"

Bury Cross, Gosport.

J. Y. HOLLAND.

#### LOCAL NAMES OF PLANTS.

A SHROPSHIRE farmer, appealing the other day against the valuation of his farm—a farmer, I should premise, of the old school—was particularly careful to point out the bad properties of a certain field, and wound up the account by saying, "Why it brings nowt but snizzle grass and hardyeds." Knowing the field, curiosity led me to look out for the "snizzle grass," which I found in multitudes of the turfy tussocks of *Aira cæspitosa*; while the "hardyed" of our bucolic friend proved to be, as I suspected, *Centaurea nigra*, the globose heads of which are hard enough to justify the farmer's designation. Not long afterwards, hearing some individuals of the same calling discussing the merits of some "stiff" soil, one exclaimed, "It's full of the devil's currycomb." "Yes," said another, "and the fellows always throw up the beggar's needle." On inquiry, I found the ominous name of "devil's currycomb" was the farmer's ap-



pellation for *Ranunculus arvensis*, a very common weed on all strong soils in Shropshire, and whose comb-like achenium quite explains the term "currycomb." Why it should be delivered up to Satan, I do not know, unless its extremely acrid properties have led to its association with the infernal power. Beggar's needle is *Scandix Pecten Veneris*, and is a name frequently given to the plant in other countries beside this. The Knot-grass (*Polygonum aviculare*) is the pest of light soils hereabouts. It comes up and grows with wheat and barley, and when these are cut covers the stubble. Some farmers say clover seed is adulterated with the seed of this plant, and thence its profusion, particularly upon barley stubble clovered down. It is known to labourer and farmer alike by the name of "pig-grass," but why, I cannot discover. That clover seed is largely adulterated there is no doubt. I once saw a large crop of *Sherardia arvensis*, with here and there a root of clover. The *Sherardia* might have been regularly cut with a scythe, and its regular growth in the drills left no shadow of a doubt of its having been sown.

Wellington, Salop.

ROBERT ANSLOW.

#### PLUMATELLA REPENS.

LAST August I obtained from a pond at Penge a quantity of that beautiful freshwater polyzoon, *Plumatella repens*, where, I may mention, they were growing thickly in masses, sometimes of considerable size, on every weed and stick. I brought some pieces away with me, and placed them in a pond in this neighbourhood (Sheerness), where I had the satisfaction, the other day, to find they had become naturalized in their new abode.

I have derived so much pleasure from observing these beautiful objects, that I am induced to think a few words on the subject may interest such of your readers as may not be already quite familiar with them, and have called the pencil to my aid to give, so far as can be done, some idea of their appearance. They belong to the molluscos division of animated nature, of which, with the Tunicata, they form the lowest subdivision, being called Bryozoa on account of their mossy appearance when viewed in clusters. They have a superficial resemblance to many forms of marine polypes, as *Sertularia*, *Lao-medea*, &c., from which, however, they are widely distinguished by the possession of an anal orifice, and the presence of striated muscular fibre. In fig. 196 I have shown a colony of these creatures attached to a stem of water crow-foot, and exhibiting various appearances, according to the aspect in which they are viewed, as seen with a pocket lens. Fig. 198 shows a single individual enlarged, viewed with an inch glass: *a* is the crown of tentacles, *b* the exterior and transparent covering

thrown off by the inner and living sac, *c*, from which the tentacles are protruded by a process of eversion similar to the turning inside out of a stocking. The stomach-cavity, *d*, is surrounded by thick walls of great contractility, whereby a continual movement of the contents is kept up, the food being alternately driven up and down the stomach, at the lower end of which I think I have sometimes detected a very delicate inner lining, which seemed



Fig. 196. Group of *Plumatella*.

to prevent the dark-coloured mass of food from completely reaching the bottom in its downward course: *e* is the intestine, having its anal orifice at *f*, close under the base of the disc of tentacles; and from this orifice masses of excrementitious matter are occasionally seen to pass and float away in the surrounding water. The disc from which the tentacles proceed is called the Lophophore, or crest-bearer, and I have made it the subject of a separate drawing under a half-inch glass (fig. 197). It is of a deeply crescentic, or rather horseshoe shape, as is most



frequently the case with the freshwater polyzoa; whence they have been separated from the marine species under the name Hippoerepia (horseshoe-like), the latter kinds being termed Infundibulata, from their resemblance to a funnel, the lophophore in these being circular. It is difficult to give an adequate idea of this beautiful object by means of the pencil; the play of the cilia, the whirl of particles toward the mouth, together with the ever-shifting and graceful movements of the whole

enue disappears as the egg approaches maturity. The eggs, after their escape from the cell, produce a ciliated embryo, from which a new colony springs. In one cell the egg appeared to be connected by a chain of three or four almost transparent bodies to the lower part of the cell-wall, whilst in other cases they were free. Another kind of egg, or rather bud, is produced in the tubes, called Statoblasts, or resting eggs: they remain in the tube till the death of the colony, when they are set free by decompo-

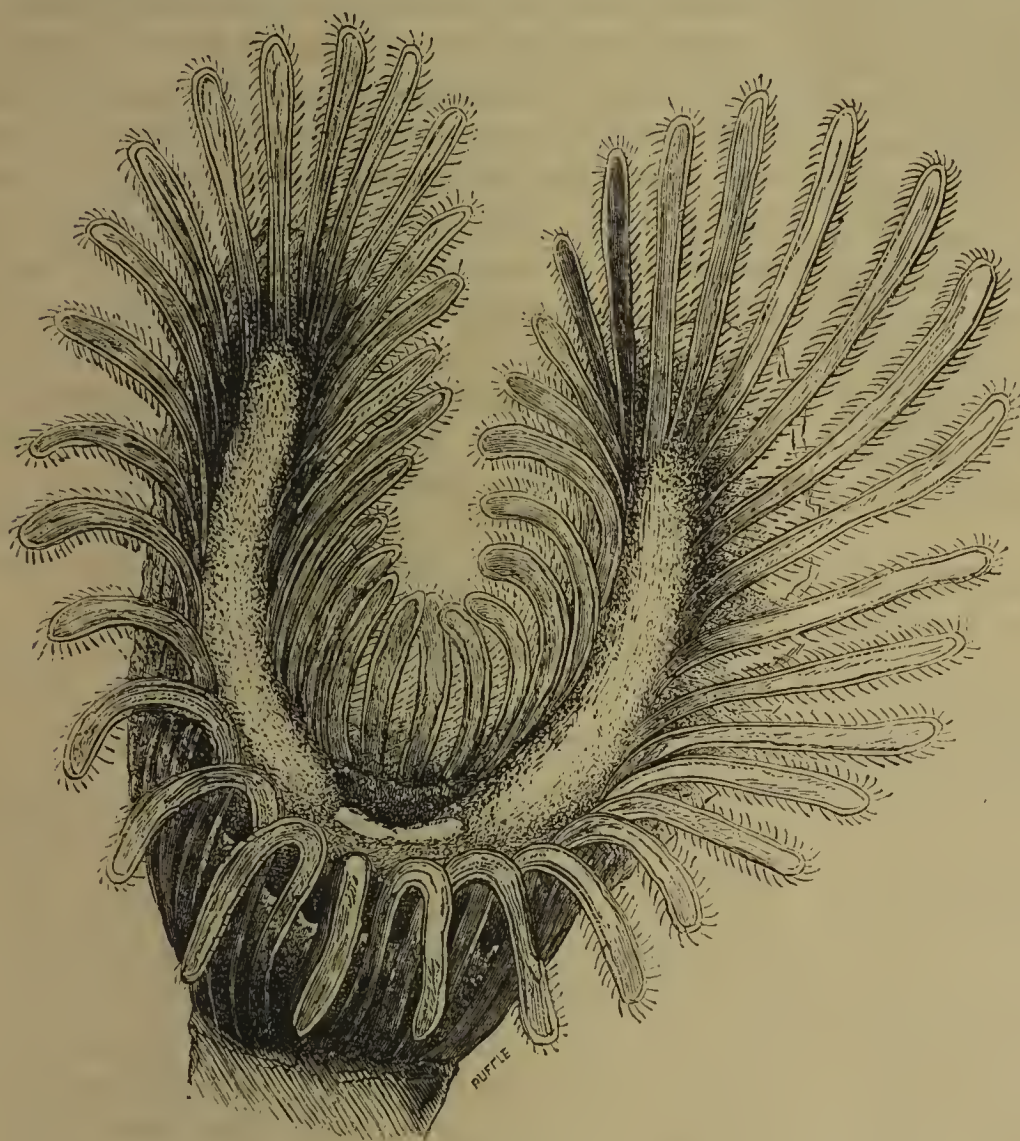


Fig. 197. Lophophore of *Plumatella repens*,  $\times 120$ .

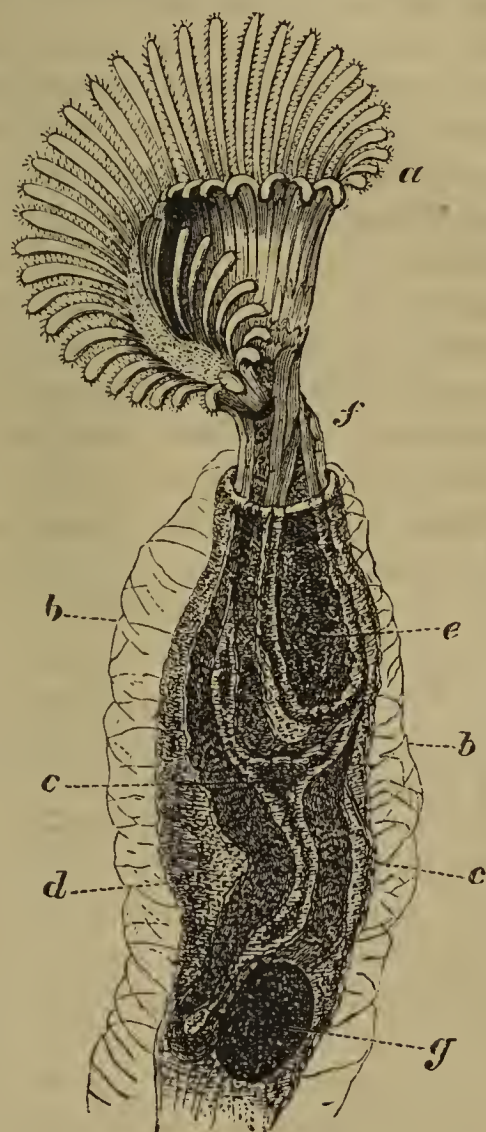


Fig. 198. Single individual of *Plumatella*,  $\times 60$ .

organ, and of each tentacle separately, must be seen to be appreciated. A fleshy tongue (*epistome*, over the mouth) projects from the base of the inner circle of tentacles, and may be seen to contract as particles pass down. A transparent membrane connects the bases of the tentacles, which are generally curved regularly outwards, but are sometimes protruded in a tangled mass; but this is, I apprehend, indicative of discomfort of some kind to the creature, owing to confinement against the glass of the tank, or to insufficient water. In some of the cells are seen eggs of a dark colour, floating in the fluid that fills the internal sac: they are oval bodies, somewhat flat, and occurring either singly or four or five together: one of them was continually revolving the whole time it was under observation, probably the effects of currents in the surrounding fluid.

While immature, the centre of the egg is surrounded by a ring of lighter colour; but this differ-

sition, to emerge into life in the following spring. A number of muscles may be seen attached to the intestine and the wall of the cell, by means of which the creature draws in the crown of tentacles with great rapidity when alarmed, everting them at leisure when the danger has passed, by a constrictive movement of the cell, which has the effect of forcing out its contents. The tentacles at first appear in a confused mass, but soon fall apart if all goes well, and the capture of prey and the aëration of the fluids proceed as merrily as ever.

A. HAMMOND.

RARE MOTHS AT WESTON-SUPER-MARE. — On the 13th of August last I captured a good specimen of the Striped Hawk-moth (*Deilephila lineata*) at Weston-super-Mare, flying about a bed of petunias, in some public gardens there. At the same time I took also a much-worn specimen of the Bedstraw Hawk-moth (*Deilephila Galii*).—R. Aldridge, Clifton.



## MICROSCOPIC AMPLIFICATION.\*

THE problem of amplifying the image formed by the objective of a microscope beyond the limits which are fixed by the ratio between the conjugate foci of the objective itself, by means of interposed lenses, called amplifiers, without destroying definition, and without distortion, has been the subject of many experiments; but, thus far, only a very limited enlargement has resulted.

By increasing the ratio between the conjugate foci of the objective, the size of the image is increased; and, in the hope of making this principle available, microscopes of enormous length have been constructed, and so arranged, for convenience, as to return the image by reflection to an eye-piece fixed near the object; but no objective has yet been made which will preserve definition with a difference between the lengths of its conjugate foci, great enough to give such enlargement to the image as is here shown; and the shortening of its anterior focus rapidly reduces the working distance of the objective to an impracticable length.

Enlargement may be effected by reducing the focal distance of the eye-glass; but the limits are very narrow within which the convexity of that lens can be increased, without obscuring and distorting the image; and experience inclines microscopists more and more to the use of longer eye-pieces and shorter objectives.

The utmost effect of all former arrangements, so far as results have been published, has been to magnify the object, with good definition, less than fifteen thousand diameters; beyond which, no recorded result is known to microscopists in this city, and no such enlargement has been observed here.

The amplification now exhibited to you reaches 98,000 diameters, and is obtained without removing the object from the eye beyond the distance permitted by an ordinary microscope, and without losing definition or sufficient light. The microscope used is the well-known instrument by Mr. Zentmayer, of Philadelphia, furnished with an objective by Mr. William Wales, of this city, having a focal distance equivalent to one-thirtieth of an inch, which is worked in combination with the ordinary "C" eye-piece of Zentmayer, the focal length of whose eye-lens is half an inch. A combination of lenses, which is believed to be new, is interposed between the objective and eye-piece, and is now exhibited to you. The formula of this combination will be submitted on a future occasion.

The object first subjected to examination is an angulation, prepared by Bourgoigne, the distance between the lines of which is one fifty-two thou-

sandths of an inch. An apparent field is presented which measures eight and a half inches in diameter at the distance of eleven inches from the eye. Diametrically across the field, only four and a half rows of the hemispheres of the angulation appear, and the entire area contains only fifteen of them. The definition is clear and equally good over the whole field. The hemispheres appear free from chromatic aberration, and are of a light grey colour on their illuminated surfaces. The crescent-shaped shadows and the interspaces are perfectly distinct, and the general effect is similar to that of a plain disk of light-brown material, eight and a half inches in diameter, placed at eleven inches from the eye, and illuminated by oblique light, upon which fifteen hemispheres of grey plaster have been symmetrically arranged. The accompanying photograph, made from a model, exhibits the true size and general appearance of the field.

The *Surirella gemma* under an enlargement of ninety-eight thousand diameters, and human voluntary muscle under twenty thousand, produced by this method, exhibit new and remarkable appearances, which will be the subject of future study and exhibition to the club.

The illumination of the object, when amplified to forty-five thousand diameters, is sufficiently bright, with Dr. Higgins' student's lamp arrangement; but for higher powers more light is required, which is conveniently obtained by an incandescent calcium pencil, the rays from which are made parallel by an achromatic convex lens, and then condensed upon the object by an Abraham's prism, which last-named instrument cannot be too highly praised. A coal-oil lamp, instead of the calcium pencil, gives fair illumination under this high power. It is apparent that, thus far, we are using this combination under serious disadvantages, and that much more may be expected from it when properly worked. When used in an ordinary house, a loud voice speaking in the room makes the image flit out of view, and a step on the floor destroys all distinctness of vision. It is necessary to plant the instrument upon a stone foundation before all its powers can be developed; because the vibrations of a dwelling-house, whose amplitude may not be enough to be seen in the field, must impair the sharpness of outline, just as an unsteady foundation does with the image in a telescope of large power, even when the tremor cannot be otherwise detected.

The "fine adjustment" of the Zentmayer is too coarse for this work; although the objective is moved by it seven hundred times slower than the finger moves which touches the milled head; yet the lightest possible pressure upon the screw changes the focus, although the milled head be not sensibly moved; and when the finger is withdrawn, another change occurs, so that very delicate manipulation is required to leave the adjustment exactly right.

\* A paper read before the Bailey Microscopical Club, New York, May 31st, 1870, by Mr. Edward A. Dickerson, of that city, a Member of the Club.



## THE LOTUS.

I HASTEN to correct a misapprehension. In describing the Lotus, I did not indicate it specifically as an object of direct worship, but as an adjunct thereof.

Your correspondent C. F. White, breaking off abruptly, has omitted a very important passage from his quotation. Sir Gardner Wilkinson proceeds: "though it is an emblem of the god *Nofre Atmoo*." (iv. 411.)

As our great Egyptologist has been thus referred to, I will condense his further remarks. He states, generally, that the *Lotus* was a favourite flower with the ancient Egyptians: it appears freely introduced in views of their interiors, and was indispensable at a grand banquet; it was a frequent offering to their gods, kings, and dead; finally, lotus-buds are found in their tombs.

It was, as above stated, an emblem of the god *Nofre Atmoo*, *nofr* = good (fig. 199). *Ehôou*, also,



Fig. 199. *Nofre Atmoo*, after Sir Gardner Wilkinson.

their god of day, who has been identified with Eos, is sometimes represented as sitting in the flower of the Lotus. Sir Gardner is quite certain that this refers to the *Nymphaea Lotus*, the common white lily of the Nile.

The learned Von Bunsen remarks that almost all that was known of the ancient Egyptians till within a period of about forty years, is only the account of the Greeks, who may have quite misunderstood the matter.

Foremost of these is Pythagoras, who originated the theory of the Egyptian bean,—*κύαμος*, the *Nelumbium speciosum* of botanists. It is from a Greek source that we have Sir G. Wilkinson's quotation, "When Egyptians approached the place of divine worship, they held the flower of the *agrostis*

[lotus] in the hand." It is from classical writers, only, that we know the *N. speciosum* ever grew in Egypt, where it is now unknown.

Herodotus (ii. 92) says: "Great numbers of lilies, which the Egyptians call lotus, spring up in the water: these they gather and dry in the sun; then, having pounded the middle of the lotus, which resembles a poppy, they make bread of it, and bake it. The root also of this lotus is fit for human food, and is tolerably sweet, and is round, and of the size of an apple. There are also other lilies, like roses, that grow in the river, the fruit of which is contained in a separate pod, that springs up from the root in form very like a wasps' nest; in this there are many berries fit to eat, both fresh and dried." The latter is the "bean," *N. speciosum*; the former are *N. Lotus* and *N. cœrulea*, both still met with in Egypt.

Whoso complains of this ambiguity will please remember that the same doubt shrouds the identification of our own *sacred* mistletoe, at a much more recent epoch.

A. H.

## ZOOLOGY.

THE LARVA OF THE LACE-WING FLY AND ITS FOOD.—In vol. v., page 15, is a very interesting account of the transformation of the Lace-wing Fly, from the elliptical stalked eggs to the perfect insect, with an account of the ravages it makes among aphides; whence its name of Aphis-lion. It has fallen to my lot to detect another food-supply to these ravenous larvæ, viz., the eggs and larvæ of Lepidoptera. The circumstances were these: I was preparing a paper on the eggs of Articulata for the Brighton and Sussex Natural History Society, and had for days been watching different batches of eggs, in hopes that I might be able to exhibit the larvæ escaping from the egg. One batch of the Dots (*Manestra persicariæ*) deposited on a plant of prince's feather, being most advanced, I plucked the leaf about five o'clock in the afternoon of Thursday, July 25th. Turning the leaf up, I noticed a larva of the Lace-wing upon the eggs, and apparently engaged in feeding; I cut off the portion of leaf, and placed the eggs and larva in a live-box, and then watched the proceedings for half an hour under the microscope, and had the satisfaction of seeing it deliberately insert its powerful jaws in one egg after another, draw out, and devour the immature larva. Two members of my family also witnessed the same state of things with other eggs, and the same evening several members of the Society saw the larva suck other eggs. The next morning I found some of the Dot larvæ had escaped from the egg in the night. As one of these approached the Aphis-lion, apparently unconscious of danger, it was seized and sucked dry. This state of things con-



tinued until the whole of the eggs or larvæ were devoured. This predilection for eggs and larvæ of Lepidoptera may be well known to other naturalists, but I have not seen it recorded anywhere. I can now account for the otherwise mysterious disappearance of several batches of eggs in my garden that I had been watching or trying to preserve. In connection with the fly (*Chrysopa perla*) itself, Mr. Peake, of Brighton, has discovered a *Pygidium* upon it. All microscopists are aware that the common flea supplies a *Pygidium*, sometimes used as a test object; but that the Laee-wing fly had one is not generally known, and microscopists may now add another object to their cabinets, for at this time of the year the insect is easily obtained.—*T. W. Wotton*, Brighton, Sept., 1870.

HELIX NEMORALIS.—In relation to a query about *H. nemoralis* in last month's SCIENCE-GOSSIP, I send the following note:—*Helix nemoralis*. Wherever I have had an opportunity of examining sand-hills, I have found *H. nemoralis* in great abundance, both alive and dead. At Great Yarmouth it is almost the only mollusc on the sand-hill there; the empty shells drip together when the sand is loose by the wind, while the living ones are hidden amongst herbage under lichens and moss. Beetles and ants destroy the snail or empty dead ones, and the shells last a long time, gradually accumulating, which may account for the numbers noticed by H. Allingham in a dead state. On the Irish coast they seem fond of sea air.—*Harry C. Leslie*, Erith.

HAWK-MOTHS.—As Mr. Newman tells us that the undoubtedly British specimens of *Deilephila livornica* in English cabinets are "few," I have much pleasure in enabling you to add to the number the record of one more authentic capture. On the 8th of September it was my good fortune to catch one with the net, as it hovered over the geraniums in my garden just before dark. It is fresh and in perfect condition, as if on its first excursion after leaving the pupa-case. The Hummingbird moth is a nightly visitor to my flower-borders; sometimes a pair may be seen probing the tubes of the Wiltshire Lass geranium within two feet of each other. Two years ago I took *S. convolvuli* near the same spot. Perhaps it may be of use to some of your readers to describe a means, which I have employed with success, of extricating these large moths from the net without rough handling. I carry in my waistcoat pocket one of Highley's dropping bottles containing chloroform; grasping the net above the insect, I either lay it gently on the ground, when the moth ceases to flutter, or, if it becomes quiet without this process, I at once drop on it a few drops of chloroform through the gauze, and all need for squeezing its thorax is of course done away with. It should then be transferred to

the influence of laurel-leaves, for chloroform has a tendency to stiffen the muscles, while the leaves have a contrary effect; and this difference, as lepidopterists know, materially affects the ease of setting. As "Gossip" is garrulous, I am tempted to go on with more experiences of this season for the encouragement of young collectors; for a few evenings before *Livornica* fell a prey to my net I had obtained my first specimen of *Catocala promissa* by sugaring. The same lure has given me four *L. stamineola*, and some other good insects in more or less plenty, as, e. g. *Agrotis puta*, *Noctua umbrosa*, *H. micacea*, *Cosmia diffinis*, *T. interjecta*, *C. Cythærea*. Former seasons have given me from the same trees, *E. nigra*, *I. subsequa*, *X. petrificata*, *X. semibrunnea*, *P. festuæ* (only one), *N. neglecta*, *C. alsines*.—*H. G. W. Aubrey*, Salisbury.

QUAIL'S EGGS (p. 209).—Bewick says: "The female makes her nest like the partridge, and lays to the number of six or seven eggs; but in France, according to Buffon, they lay fifteen or twenty." We may truly say of them, "they do these things better in France." Mudie says they lay as many as the partridge; i. e., seldom fewer than a dozen.—*W. R. Tate*, 4, Grove Place, Denmark Hill.

BEEES AS BOTANISTS (p. 215).—I am afraid I have no right to take the credit of having discovered the fact (?) that bees collect honey from only one kind of flower during the same journey, though Mr. Britten and Mr. Grindon ("Little Things of Nature") are both kind enough to say that I was the first to notice it. It may, possibly, have been from me that these friends of mine first heard of the circumstance, and so they have thought the discovery was mine. I do not know when or how I first became acquainted with this curious fact, as I believe we must call it; but I fancy it was from the letters of the *Times* "Bee-master," which were published some years ago. As far as I have observed, however (but I have not looked into the matter very closely), I do think that bees, when foraging, confine themselves, though not strictly, to one kind of plant, and I use the word "kind," in order to include allied species; for I do not suppose that bees which were collecting honey from *Trifolium repens*, for instance, would pass over *T. elegans*; neither would bees that were sipping the sweets of *Rosa canina* object to the nectar of *Rosa arvensis*. Indeed, in this way there is no doubt that hybrids are formed between different species. I cannot help thinking that, in thus confining themselves to one kind of flower, bees are guided by the sense of smell. Even to our olfactory nerves, there is a notable difference between the honeys obtained from several kinds of plants. Heather honey has an unmistakable perfume, so has that from orange-flowers—that is, if the so-



called Narbonne honey be genuine, and be not common honey flavoured with oil of Neroli. If, then, *we* can detect difference of perfume in honey, it is quite possible that bees, whose chief business of life is the collection of honey, should perceive differences of smell that are quite inappreciable to us; and that, carrying about with them a peculiar odour of the first honey they collect, they should only stop at such flowers as have a similar perfume. This would be one way of accounting for the strange instinct that has been observed.

On the same page (215), I see that Mr. McHine records the fact of bees decidedly moving from one species, or even genus, to another. No doubt they sometimes do so; and it may be that, during this exceptionally dry season, scarcity of food may have induced them to do this. Bees are in bad plight; try them with some sugar and water, and see how they will crowd around it, even whilst you are feeding them. Thus they *may* be driven by necessity to visit any kind of flower that comes in their way. —*Robert Holland.*

QUEEN OF SPAIN FRITILLARY.—I am not aware that a specimen of *Argynis Lathonia* (the Queen of Spain Fritillary) has ever been taken in this neighbourhood, until I had the pleasure of capturing a very good specimen on the 11th Sept. It was sunning itself on a flower of the Scabious in a cornfield at the edge of a wood, about a mile from hence. Being a young collector, I was somewhat doubtful of my prize, until I had shown it to a neighbour much more experienced. As this butterfly is rare as "a native," I think you may possibly like to notice my capture in the next number of SCIENCE-GOSSIP.—*John G. Butler, Hungerford, Berks.*

SWARM OF BEETLES.—The town of Leicester is in a state of siege; we are beleaguered by millions of small beetles; and, as our town is an "open" one, we have not been able to keep them out of our streets; but we are resolved to conquer or die! We are trampling the invaders under our feet; thousands perish daily; the flagged foot-pavements are spotted everywhere with coleopterous blood. In the fields outside the town, the air is filled with Lilliputian armies. The little plagues, about a quarter of an inch long, black-headed and brown-winged, with pale legs and short antennæ, creep into your beard, and tickle your cheeks, and settle all over you, and if you open your mouth to speak, silence you in a very unpleasant manner. The name of our enemy appears to be *Aphodius sphaelatus*, one of the smaller dung-beetles.—*T. T. Mott.*

D. GALII AND D. LIVORNICA AT BRIGHTON.—The very warm summer seems to have been favourable to these moths, the capture of specimens of which are recorded from all parts. As far as I can find by inquiry, about nine or ten of each have been

taken in or about Brighton and Lewes. I have also heard of their larvæ which have turned out fine moths. As often happens, the captures have in most cases been made by little boys.—*T. W. Worsfor, Brighton.*

AGE OF THE SALMON.—On the 28th of July last, a salmon, twenty-nine pounds in weight and four and a half feet long, was caught in the Stoke nets on the sandy coast of Belhelvie, seven miles north of Aberdeen. On each side of the body, a little in advance of the tail, was a depression of the size of a sixpence, and destitute of scales. The depressions were opposite each other, and the substance of the fish between them was so thick as to be quite opaque when held up to the light. Suspecting this to be an artificially-marked fish, I wrote to Mr. Marshall, of the Stormontfield Salmon-breeding Ponds on the Tay, near Perth. He has no doubt, from the description sent, that the fish in question had been bred in the Stormontfield ponds. It is now seven years since smolts were marked before being let into the Tay. For two or three years before this they were marked with a small silver ring put through the fish just above the tail, but none have ever been heard of as having been caught with the ring *in situ*. The fish caught on the Belhelvie coast must be eight or nine years old, and must have migrated along at least seventy miles of coast. Some years ago, a good many of the Stormontfield smolts were marked by cutting off the *dead fin*. Many of these, so marked, were caught afterwards as grilse or salmon. Most of them returned to the Tay, but some were caught in the Forth and Tweed, and on the Aberdeenshire coast.—*Alexander Cruickshank.*

COLOUR IN FROGS.—One of my pet frogs having died this morning, I take the opportunity of writing to mention an unusual circumstance concerning him. He came into my possession from Maresfield, in Sussex, on July 8th, 1867, and was originally, like the Wedding Guest in the "Ancient Mariner," "one of threc." Of this noble triumvirate, one soon went to the shades, another still survives; but of neither of them is there anything remarkable to record. My recently departed friend, however, some time after he had been with me, underwent a singular change of colour; his breast and throat became of a bright red-brown or chestnut hue, not unlike that sometimes seen in a cow. It was so vivid that he always went by the name of "the Robin." For some months after his capture, he showed no peculiarity of tint, but as he grew from a small to a rather large frog, especially in width, this bright colour developed. He was a favourite from his tameness, sitting contentedly on the hand, and eating anything that was given him, besides a good deal that was meant for his companions.—*G. Guyon, Ventnor.*



## BOTANY.

GOOD KING HENRY (pp. 189, 211, 214).—I have been looking up this name with but little success, yet the results of my search may be of interest to some. In Dodoen's *Stirpium Historiæ*, I find:—"Germanis *Schmerbel* vocatur, et *Guter Heinrich*, id est, *Bonus Henricus*, à singulari quadam utili facultate: veluti et perniciosam quamdam, *Malum Henricum* appellant." I quote, word for word, from the edition published at Antwerp, in 1616, shortly after the author's death, p. 651. A description of the *Malus Henricus* follows, quoted from Gesner, who says that a plant was so called by the country people; from his description, it would appear to have been *Lathræa squamaria*. Unfortunately, the existence of this "Bad Henry" does not tend to simplify matters, as we do not learn on what grounds the name Henry was applied to either plant. The English name given in Dodoen's work, and in most of the old writers, is "English Mercury," also "Allgood," corresponding with the French *toute bonne*, the German *all gut*, the Dutch *algoede*, and the Latin *tota bona*. Can "J. R. T. C." inform me who first started the notion that the "good king" commemorated was Henry VI.? or where he met with it? I have not seen it except in *English Botany*, ed. 3, vol. viii. p. 25, where it is given as from some writer (name not stated), but I have not been able to meet with the original passage. Neither do I know why it should be supposed that Henry VIII. has anything to do with the name of the plant. The name first appears in Gerarde's Herbal, where we are told that it was in use in Cambridgeshire; but I have no other record whatever of its actual use, and suspect that it has been kept up in books from its quaintness, and from its connection with the Latin *Bonus Henricus*. I would offer as a suggestion that the name, which is obviously of some antiquity, was introduced to England from Germany. Now, whether we take the Dutch *Golden Henrik*, or the German *Guter Heinrich*, we have in each case one syllable more than we should find in the corresponding English translation, Good Henry. All who have studied plant-names know how, when an appellation, unintelligible to the many, becomes popular, it gets converted into something which, at any rate, *sounds* as if it had a meaning; and I would suggest that just as, in a Shropshire list of names, I find Gromwell developed into "Oliver Cromwell;" so *Golden Henrik* or *Guter Heinrich*, has been popularly translated into good King Henry, or Harry. It must be remembered that the name is only recorded from one district, where it is perhaps not now in use; and that our familiarity with it arises from its occurrence in British Floras, where it has been copied from one into another. It may not be generally

known that the French have put forward a candidate for the honours of the dedication. In Withering's "Arrangement," ed. 7, ii. 343, I read:—"How the name once idolized in France came to be applied to this vegetable of mean aspect, it may not be easy to trace; but, in the opinion of a French writer, 'This humble plant, which grows on our plains without culture, will confer a more lasting duration on the name of Henri Quatre, than the statue of bronze placed on the Pont Neuf, though fenced with iron and guarded by soldiers.'" Query, who was this "French writer"? I have looked into several French books, but find no name for *Chenopodium Bonus-Henricus* in any way corresponding with "Good King Henry."—*James Britten, F.L.S.*

HOLLY-TREES IN BERRY.—There is a holly-tree in the village of Groby, four miles from Leicester, which I have known for twenty years, and have passed frequently at all seasons; I have never once seen it without a crop of scarlet berries upon its boughs, and have often pointed it out as a curiosity. There are several yellow-berried hollies in the Loughborough School grounds now loaded with apparently ripe fruit.—*T. T. Mott.*

HOLLY BERRIES.—It may interest "J. D." and "A. E. B." to know that, a year or two ago, I met with a holly-tree in the neighbourhood of Selby, Yorkshire, with a large quantity of berries on, which were bright red; but found on examination they were old berries, and that the tree was in flower for following year's fruit. May not the trees mentioned by them be an instance of this kind, and be accounted for in the same way? Perhaps further investigation might result in settling the matter in this way.—*T. W. R.*

ENGLISH PLANT-NAMES.—The attention of our correspondents is directed to the notice thus headed at page 210, and their assistance earnestly solicited. Lists or notes of local names, traditions, folk-lore, &c., may be sent to James Britten, F.L.S., Royal Herbarium, Kew, W.; or Robert Holland, Mobberley, Knutsford, Cheshire.

BOG PLANTS AT FRESHWATER (p. 210).—My letter to the editor requesting him to cancel my note on p. 210 did not reach him in time, I presume, for him to do so. The plant I took to be *Cladium* agreed in many respects with the book-descriptions (the inflorescence was too far gone to be of service), but I have since seen specimens in the Kew Herbarium which clearly show me I was in error. I fear it is even less easy to find than it was in Dr. Bromfield's time. [In Dr. Bromfield's manuscripts, he states that Dean Garnier once told him that he (the Dean) believed he had found *Malaxis paludosa* in the Isle of Wight. I believe this discovery (?) has never been confirmed.]—*R. T., M.A.*



## MICROSCOPY.

FERN STARCH, &c.—In the Proceedings of the Geological Society for August is a paper by Mr. W. Carruthers, in which the following observations are made on the occurrence of starch and the mycelium of a fungus in a species of fossil fern allied to *Osmunda*. "Not only are all the cells and vessels intact, but even the starch granules, which abound in the parenchyma of ferns, still fill the cells in which they were originally formed; or rather, I should say, the silica by which they are replaced, and which assumes their form, is there. In the form of the granules, and in the method in which they are packed in the cells, the fossil agrees exactly with the recent species. Many of the cells contain the mycelium-threads of a parasitic fungus, which are inarticulate, and probably belong to the genus *Peronospora*, one species of which is too familiar from the injury it has brought on the potato crops. The dead stem of the fossil must have been at once attacked by this parasite; it could never have been desiccated, as the most delicate tissues are perfectly preserved. Buried in the moist clay, the silica must have speedily replaced the organic tissues, before the most delicate cells, the mycelium-threads, or even the starch granules, were disorganized." Without intending to insinuate anything derogatory to Mr. Carruthers' powers of observation, I should be glad to learn what is the *evidence* that the granules observed by him are really starch granules? Was there a hilum present, or concentric lines? Or was it a supposition? Of course the iodine test and the polariscope were useless upon silicified (?) starch. Also, what grounds are there for believing that the mycelium of the fungus was that of a *Peronospora*? Hitherto no one has been able to determine the genus of a fungus from the mycelium. Moreover, can Mr. Carruthers name any other *Peronospora* which is *not* developed upon living plants? —S. T.

JUTLAND DEPOSIT.—Some of the forms of Diatomaceæ found in this remarkable deposit are described and figured by Mr. F. Kitton in the current number of the *Journal of the Quekett Microscopical Club*, being the substance of a paper read by him at one of the recent meetings. The species of *Trinacria* and *Hemiaulus* are beautiful, and of considerable interest. Slides of this deposit, prepared by Herr Moller, were some time since introduced into this country for sale, and at once became popular amongst microscopists.

SPONTANEOUS GENERATION.—Mr. B. T. Lowne read an important and interesting paper on this subject at the meeting of the Quekett Club on the 23rd September, during which he described experiments, conducted by himself, demonstrating that

boiling does not destroy the germinating powers of the spores of fungi. The paper was succeeded by an animated discussion, in which the president, Professor Lionel Beale, took part.

HAIR OF MAURANDYA.—I am not much of a hand at drawing, but have sent a sketch of the hairs on the seed-vessel of the *Maurandya*, which I think are worth notice among the hairs of plants; the stem is transparent, and the knob at the top is yellow; the stalk has a quantity of granules of some kind in it, and it seems to contain a good deal of oil. The seeds are curious irregular-shaped bodies, spiny, like the mallow pollen when green. The plant is a beautiful purple-flowered creeper. I shall be happy to forward some seeds to any one who would like to have them, and will exchange any slide for them.—E. T. S.



Fig. 200. Hair of *Maurandya*, magnified.

SCALE OF CRUCIAN CARP (*Cyprinus carassius*).—This is a very interesting addition to the series of fish-scales which have appeared in this journal. It was taken from the side of the fish, and appears to differ from those on other parts, by the channel running downwards from the



Fig. 201. Scale of Crucian Carp (*Cyprinus carassius*).

centre of the scale, and terminated by a rounded orifice. These scales are apparently in a line along the side.

ALCHEMY SUPERSEDED.—Henry Cockeram, in his English Dictionary (edition 1655) thus describes *Ulex*: "An herb like rosemary, which draweth gold to it." The same writer says of *Yarrow*: "An herb wherewith Achilles is said to kill or cure Telephus." These extracts speak for themselves.—R. T., M. A.



## NOTES AND QUERIES.

YAFFEL.—Yaffil appears in Mr. Halliwell's "Dictionary," ii. 943, as "the Woodpecker," a term used in Herefordshire.—*A. H.*

YAFFEL.—This word, referred to by "R. T., M.A.," does not signify a *plant*, but the Green Woodpecker (*Picus viridis*). This bird has also many other provincial country names, such as Yaffer, Eaqual, or Ecle, &c.—*C. F. T.*

YAFFEL (p. 215).—Probably the Green Woodpecker is referred to in the quotation given by "R. T., M.A." It is usually known as the "Yaffel" among country people; and its loud call, resembling the neighing of a horse, is a well-known sign of rain.—*W. R. Tate, 4, Grove Place, Denmark Hill.*

YAFFEL.—"R. T." inquires what *plant* is referred to as the Yaffel, in the extract from the *Athenæum* (SCIENCE-GOSSIP, p. 215). Yaffel or Yaffal (or indeed I do not know how it is spelt) is the common name for the Green Woodpecker in the south of Surrey, and its habit of "laughing" at the approach of rain, a matter of common belief. I have no doubt, therefore, that this bird is referred to, and not any plant.—*C. G. B.*

YAFFEL (p. 215).—This is not a plant, but a bird—the Green Woodpecker (*Picus viridis*). In the "Birds of Berks and Bucks" it is spelt Yaffle and Yaffil. The "laughing in the sun because the rain was coming," must refer to the fact that its cry is looked on as a sign of rain; whence it is called in the north "the Rain-bird." See p. 212.—*James Britten.*

YAFFEL.—In reply to "R. T., M.A.," I do not think Yaffel refers to a plant at all, but to the Green Woodpecker. In the New Forest, where the "sundew and the flowering fern" both grow, it is called the Yaffingale; and I see, in Atkinson's "British Birds' Eggs," "Yaffle" is given as one of its names. The description:

"laughing in the sun,  
Because the rain was coming,"

bears out the explanation given in your last number, of its names "Rain-bird" and "Wet-bird."—*W. H. Beeby, Croydon.*

YAFFEL.—All other correspondents, too numerous to mention, who have sent replies similar to the foregoing, will please accept our thanks.

BEES AND FLOWERS.—My experience teaches me that bees have not the selective powers attributed to them. I have watched them closely and often, and have seen them pass from flower to flower without regard to species. Quite lately I watched them for some time at Sutton, and saw my bees pass from the flower of *Carduus palustris*, every flower of which they seemed to visit, to those of *Rubus corytifolius*, which was growing adjacent; and they appeared to pay equal attention to these flowers. On the same day, at the Sutton Railway Station, I saw them pass from the flowers of the onion to those of the scarlet-runner. Here both bees and the Cabbage White were very busy, the butterflies paying most attention to the scarlet-runners, the bees to the onion flowers.—*James Bagnall.*

WATER-BEETLE MUSIC.—Can you give any information respecting the musical sound produced by the Water-beetle, *Dytiscus*? I have had one confined in a glass top box, in which was placed a pan of water with growing weeds, in which the beetle spent most of his time; at intervals it would get out of the water, particularly at eventide, and would crawl or fly across this box; but, previous to its flying, it would give out a beautiful musical sound, similar to the sound produced on one string of an Æolian harp; the tone would last for some seconds, then stop, and immediately expand its wings and fly across the box. I have watched it closely, but can detect no means by which the tones are produced, as the insect is perfectly still whilst the sound continues, but the instant it stops it takes to flight. The first I had is dead. I procured two others; they were not exactly like the first, being as large again: I kept them in a large box with a pan of water, and their habits were the same, and produced at intervals the same musical tones, and loud enough to be heard across the room. I have been reading Kirby & Spence's "Introduction to Entomology," letter 24, on the noises of insects, but there is nothing said about the *Dytiscus*, though the most interesting accounts are given of other insects. The tone given out by this beetle commences exactly at lower A on English concertinas, and as it increases in loudness rises a semi-tone to B flat. I have proved this several times. Perhaps some of your correspondents can throw a light on the subject—for how the tone is produced it is out of my power to say; for while the sound continues the insect is quite still, and I have not been able to detect the least motion of either legs or wings. I sometimes think that it may be produced by the wings under their cases in preparing for flight.—*James Fullagar, Canterbury.*

HARVEST-BUMPS.—Can any of your correspondents explain the cause of these gnat-bite looking eruptions? Many of us know, complainingly, they are the irritating accompaniments of hot weather; but few people, who suffer by them, can offer any opinion better than a speculative surmise as to their production. Medical men generally assert their appearance as a consequence of the heated state of the blood, while some unprofessional people attribute them to impeded pores of the skin; and others positively say a minute insect is the cause, having extracted them, and seen them plainly with the naked eye; though I have frequently applied a small microscope to the spot, before I disturbed it by scratching, but could see nothing that would settle the controversy.—*W. B., Fowey.*

THE BUFF-TIP MOTH (*Pygorea bucephala*).—Early in August I obtained several caterpillars of the above moth, and provided them with the necessary food and lodging. About the 22nd ult. some of them became chrysalids of the usual form, but a few others were enclosed in egg-shaped cocoons. Mr. Newman, in his "Natural History of Moths," states that the caterpillars of the Buff-tip "change on the surface of the earth, without any web, cocoon, or protection of any kind;" but, of course, he did not intend his remarks to apply to the insect in a captive state. I have inspected one of the cocoons, and find that it is inhabited by a whitish maggot-like individual, of a lively temperament. Query, in the words of Sweedle-pipe: "Is there anybody here that knows him?"—*A. T.*



BEES AND FLOWERS.—I see a query in number 68 of your interesting journal; and having kept bees for some time, and closely observed them at work, I think you may consider my opinion as of some little value. The question is, I think, "Do bees, when collecting honey and pollen, confine themselves to one description of flower each trip?" As regards honey, my opinion is they do not, as I have seen them go from one sort of flower to the other in search of it; the case is different when pollen is collecting, for here I have never observed a bee to leave the one description of plant, nor did I ever see the least shade of difference between any particle of the pollen carried into the hive by a single bee; thus one will be loaded with bright orange, while another has light yellow, or deal-colour. This may or may not be worth much in settling the question, but such as it is you are welcome to it.—*E. Walpole, Ashford, co. Wicklow.*

DRAGON-FLY IN TOWN.—On Wednesday, 31st August, at 1 15 p.m., I saw a large black and yellow Dragon-fly on the Holborn Viaduct, near St. Andrew's Church. Is not this a very curious locality for them, being some considerable distance from water to which they would resort?—*J. D. Groves.*

LOOSE-STRIPE.—What is the origin of this name as applied to the *Lysimachia*? Macgillivray, in Withering's "British Botany," says, "named from *lysis*, dissolving, and *mache*, battle. How does the Loose-stripe obtain its name?—*J. R.*

VALISNERIA SPIRALIS. — Your correspondents, "T. M. A." (August 1st) and Edward Banks (September 1st), may most probably find the solution of the mystery with regard to the above plant "having abundance of female, but never male flowers," in the fact that it is a *dioecious* plant, and they have only the female in cultivation.—*H.*

BEES AND FLOWERS.—Since writing my note in last SCIENCE-GOSSIP, I have met with the following note by Dean Wren to book iii., chap. 27, of Sir Thomas Browne's "Vulgar Errors," p. 365, Bohn's edition. "That [bees] never gather of more than one and the same flower in kinde, is manifest, *ad oculum*, that by only flying swift by over many they discern that one kinde, are arguments of their exquisite smell."—*J. B.*

TRAVELLER'S DELIGHT (pp. 188, 215).—I am unacquainted with Wraxall's "Backwoodsman," and therefore do not know in what region the work is localized. But if by the *Clematis* "G. H. H." means our British *C. vitalba*, that species is not American, and would not be referred to by a local name. Another species may be intended; but I suspect some Bignoniaceous plant is more probably the one referred to.—*James Britten.*

PYGIDIUM.—In the last number of the *Quarterly Journal of Microscopical Science*, at pages 313 and 316, mention is made of the discovery by Mr. Peake of the Pygidium of the Lace-wing fly (*Chrysopa perla*). Whoever possesses a specimen of this beautiful and delicate insect will easily see, not one, but two of these curious appendages—very similar to that on the flea. Has the use of this peculiar structure been ascertained? If so, I should be glad of information on the subject. The eggs of the *Chrysopa perla* are worth notice for the long and very strong stems by which they are attached to the leaf of the tree or plant on which they are deposited.—*J. Bramhall.*

CLIFTON COLLEGE MUSEUM.—I shall feel very grateful to any one who will kindly contribute a few good specimens in any department of British natural history to the Museum of Clifton College. We are trying to form a really good school museum, and any one who has a few shells, fossils, minerals, crustacea, insects, dried plants, &c., to spare would materially assist the cause of scientific education by giving us a donation.—*M. J. Barrington-Ward, B.A., F.L.S., Clifton College, Bristol.*

THE FLYING SPIDER.—I witnessed the flight of a spider a few days ago under circumstances that were novel to me, and probably may be so to some of your readers. While sitting near a window in my study engaged with a book which lay before me on the table, one of those little creatures of that species with whose feats of acrobatic flight I was long familiar, appeared running across the leaf. I had never seen any of them except in the open air before, and I was always under the impression that their so-called flight was nothing more than their floating away on a line of web borne by the wind horizontally. A perpendicular ascent, or an ascent in a perfectly calm atmosphere seemed out of the question. It now occurred to me to ascertain whether they are capable of accomplishing their method of journeying in the confined and unmoving air of a room. I placed my finger in its path, and in a moment it had crept upon it, and as I held it close before me it ran, as they always do, to the highest point, assumed the attitude usual with them before their flight, and rose slowly in a straight line towards the ceiling. As the sun shone through the window the long thread at the end of which it hung was quite visible. The dark little insect at the end of the flashing line of brightness, ascending without an effort into the air, was a marvellous object. The flight must be exactly like a balloon ascent. The thread which the insect emits is lighter than the atmosphere, and floats upwards, bearing its tiny aeronaut with it. I should think the first part of this thread must be lighter than that to which the spider is attached, as I could see the line extending upwards quite perpendicularly.—*W. A. O'Connor.*

SPIRAL TWIST IN CHESTNUT-TREES.—Very early yesterday morning, about 7 o'clock (Sept. 11), I passed by an avenue of young horse-chestnut trees, of some 20 years' growth, and observed, owing perhaps to the unusual light, what I had not noticed before, though I have passed the same avenue many times. The trunk of nearly every tree—and there are about a hundred of them—is more or less ribbed and furrowed longitudinally. These ribs and furrows extend from the root to the primary branches, a distance of six or seven feet, but *not vertically*. In every case they show a spiral twist in the stem amounting to about half a turn, and always in that direction which is called "contrary to the sun," that is E.N.W.S. Is this a common habit with horse-chestnut trees?—*F. T. Mott.*

ANIMATED OATS.—I am afraid that Mrs. Watney's inquiry about the above plant has elicited information that may tend rather to perplex than enlighten her, seeing *three* plants are described as being the one in question; two by Mr. Gerard Smith, *A. fatua* and *Pennsylvanica*, and one by Mr. J. Britten as *A. sterilis*. Perhaps all the above three plants may have the peculiarities alluded to; but no doubt the one described by Mr. Britten is the true animated, or as it is sometimes called, the *sensitive* oat. I quite agree with Mr. Smith that



the irritable hairs or bristles, are instrumental in burying the seed, confirming my observations on this peculiarity for a number of years. There is, however, one feature in my animated oat not alluded to by either of the above gentlemen; viz., that the strong and formidable awn is, when the seed is ripe, bent back at a right angle at about half its length. The awn, in this state, no doubt acting as a lever to assist in burying the seed, exactly in the way of the carpels of *Erodium*, as described in a former paper. *Avena sterilis* is a handsome plant with a very gracefully-arched panicle, from which the florets—which, with awn included, are fully three inches long—drop in a very pleasing manner. When fully ripe, this strange seed not inaptly resembles some very large insect, with hairy body, enormous hind legs (the bent awns), and the large expanded calyx glumes, grotesquely resembling wings; and when excited by heat, it requires a little adroitness in picking it up, and if held *loosely* in the closed hand, it is something like holding an eel; placed up the sleeve of one's coat, it will soon be found on one's back, or some other remote part of the body. Gathered before ripe, it is very handsome as a winter decorative plant, for which purpose I have grown it largely. A large bunch of these oats stood on a table in my little parlour, which from absence of fire had become very damp. After a fire had been lit, and the little room had become very warm, my attention was drawn to a strange rustling sound, something like that produced by a reptile gliding among dry leaves; on looking round, every floret in the large bunch of oats was in motion, twisting and writhing in all directions, like tortured serpents, and so strong was this motion, that, being rather *top-heavy*, it had to be taken away to prevent capsizing!—*Thomas Williams, Bath Lodge, Ormskirk.*

GOOD KING HARRY.—“W. B. G.” may perhaps be partly satisfied by reading the following passage, which I translate from Jacob Grimm's “*Deutsche Mythologie*” (German Mythology), pp. 1163, 1164, a most important work, which ought to be made accessible to English readers.—“Some herbs are called after the proper names of persons. . . . Remarkable appears the *herba boni Henrici* (*Chenopodium*), sometimes called only *bonus Henricus*, the good Harry; the *proud Harry* (*Atriplex*), the *red Harry*. These denominations I derive from the belief in elves and kobolds, who frequently are called Henry or Harry (Heinz or Heinrich), names which afterwards were also transferred to evil spirits and wizards. To their demoniac powers the medical properties of the plant were ascribed. It is not impossible that even the story of Poor Harry, the origin of which is as yet not explained, may be in some relation to a plant which cured the lepra, as it is stated that the *herba boni Henrici* was considered to be a remedy against this illness.”—*A. Ernst, Carácas, Venezuela.*

QUERIES IN No. 68.—In answer to “H. G.'s” queries in your No. 68, which I got by this mail, I would say that “Bois noir” is *Albizzia Lebbek*, Bth. (see Grisebach, “*Vegetation der Karaiben*,” 64); the “Shell-flower” is most probably *Phaseolus Caracalla*, L., called *Caracol*, i.e. *shell*, in Cuba and other parts of Spanish America; the “Pao d'arco” is *Tecoma toxophora*, Mart.; the “Massandarnba” is *Mimusops elata* (T. M. da Silva Continho, *Memoir on the Gums, Resins, and Gum-resins in the Exhibition of 1867*, published in the “*Diario oficial do Imperio do Brazil*,” Nos. 60, 61, March 9th and 10th, 1869);

the “Tiger-bird” may possibly be *Ardea tigrina*, which is called *Garza Tigre*, i.e. *Tiger-heron*, in Venezuela; and finally, the “Moca-moca” trees are perhaps identical with *Caladium arborescens*, Vent., or *C. aculeatum*, Meyer, both being known in Dutch Guyana under the name *Moko-moko* (see H. C. Focke, “*Neger-Engelsch Wordenboek*,” Leiden, 1855, p. 84). As Waterton's “*Wanderings*” are not to be found in Carácas, I am unable to speak more positively on the last two points.—*A. Ernst, Carácas, Venezuela.*

CURIOUS BODIES.—Can any of your readers tell me what is supposed to be the nature of certain fungoid bodies within the strong jaws of the Rove Beetle (*Staphylinus*), and upon the under side of the abdomen of the Click Beetle? I would call attention to the row of shield-like bodies around the opening of the ovipositor of the Rove Beetle. Insects are full of beauties and curious apparatus, and well repay the trouble of preparation and examination.—*J. B.*

COLOUR IN EGGS.—I have had in my collection for more than four years a thrush's egg which, so far, has shown no sign of fading, but remains as bright a blue as when I first took it out of the nest, while all the others have turned pale, and have lost half their beauty. Could you kindly throw a little light on the subject? I may mention that this egg has not been varnished, neither have any of the others.—*S. A. Harry.*

AQUARIUM WORMS.—Could you or any of your readers kindly inform me how to get out of an aquarium worms (I think) of the Nais tribe? I can find very little about them in books on the microscope. I have a number in the mud of my aquarium, and have tried the dipping-tube, but that has failed; have tried to scoop them out with some of the mud, but have been alike unsuccessful, as they dart into the mud in an instant, and are nowhere to be found; so should be very much obliged, if any one could inform me how to capture them for examination under the microscope.—*S. I.*

HELIx NEMORALIS (p. 215).—These shells are frequently very common on sandhills near the sea; and, of course, in places where they have been undisturbed for a long time, “dead” shells are numerous. From Mr. Allingham's account, however, it would seem that there are now no living specimens on the sandhills he mentions; and, consequently, it would be interesting to learn whether the dead ones there are similar to the curious shells of this species found, some years since, near Connemara, by Mr. Thomas Glover, of Manchester. The shells discovered by that gentleman were large and porcelain-like, extremely thick, and consequently heavy, and some, which were cut in half, were found to have a calcareous deposit in the upper whorls. Many suggestions as to their origin, and the cause of their remarkable condition, were put forth, and they were generally regarded as fossil shells of a recent deposit.—*G. H. H.*

QUAILS (p. 209).—The Rev. J. C. Atkinson, in his little book on “*British Birds' Eggs and Nests*,” speaking of these birds, says: “They do not pair, and their nests are met with in various parts of the kingdom. . . . A small depression in the ground is made, or found, and loosely lined with bits of grass and dry stalks. Seven to ten, or possibly yet more eggs, are laid, presenting much variety of appearance,



but usually of a faint cream-coloured ground, mottled and clouded in some cases with red-brown, and in others spotted with dark brown spots, some of considerable size."—*G. H. H.*

**SINGULAR DEATH OF A SPIDER.**—There are sundry individuals claiming the name of *Aranca domestica*, who spread their webs in an outhouse on my premises, and to whom, by special charter, I have secured immunity from the attacks of brooms. In return for their philanthropic efforts in reducing the number of insect annoyances, I reward them occasionally with a fat blow-fly, having first removed one wing, for it is rarely that a spider can succeed in mastering one of these insects when he is in full vigour, and with all his members in action. Placing a fly on a web the other day, after the usual preliminary struggle, the spider had seized the fly by the thorax, and was "holding on," when it suddenly quitted the prey, turned short round, and remained motionless. The fly, thus liberated, moved slowly across the web. Never having observed that spiders were given to fits of meditation, I was at a loss to understand the conduct of this individual. I blew smartly upon it; still it remained motionless. I might have supposed that it was feigning death, but the legs were extended, a posture never assumed by the spider when alarmed. I removed it from the web, and left it for some minutes. Returning to it, I found it still motionless, and upon examination, it was evidently quite dead, though there was a slight twitching in some of the legs. How to account for this almost instantaneous death was the query. I fancied there might be something poisonous in the fly which had affected the spider. Securing it, I handed it over to another spider, which speedily disposed of it, receiving no harm apparently. Though I could perceive no wound on the body of the defunct spider, I imagine that it must have, by accident, given itself a puncture with one of its fangs, and thus ended its life like the engineer who was "hoisted with his own petard."—*J. R. S. C.*

**CATERPILLAR OF EMPEROR MOTH.**—In this species I have observed that caterpillars which, when young, appear to be of nearly the same size, will arrive at mature proportions at very different times, though fed similarly, and kept in the same temperature. Similar instances have been noticed amongst other moths: the butterflies generally appear to be more uniform, though occasionally some of the autumn brood of the caterpillars of the Large White will live on through the winter, when the remainder have become pupæ. But with the Emperor larvæ it is especially observable that out of a number in feeding, a few will live on for a month or more after the rest have completed their cocoons. Individuals received from the north of England, even when fed up in the London district, are much slower in their growth than southern specimens, nor do they attain the same size. The caterpillar of the Emperor appears to thrive best upon willows in confinement, though most frequently found at large feeding upon heather. The hawthorn, which they will eat, and on which they are sometimes taken, develops rather stunted individuals. They will eat also oak and blackthorn. Instinct, we hear it sometimes said, is an unerring guide. It is scarcely so in matters which require foresight, though remarkable in the power of adapting means to a present end. Thus the caterpillar of the Emperor forms its cocoon after a certain model, and would

keep as near this as possible, however limited as to space, and the unadhesive nature of the substance to which it had to be attached. Yet, in a breeding-cage, two larvæ formed their cocoons in close proximity, but with the apex of one directly opposed to the apex of the other, separated only by a space of a few lines. The necessary consequence (were these left undisturbed) would be that at the time of emergence neither moth could extricate itself, and each would die imprisoned in its cocoon.—*J. R. S. C.*

**LACEWING FLY (*Chrysopa perla*).**—While turning over some back numbers of *SCIENCE-GOSSIP*, I came upon a notice of the Lacewing Fly (vol. v. p. 15), in which it is stated that this fly emits, on being captured, a strong pungent odour. I have twice captured *Chrysopa*, but on neither occasion did I perceive the slightest odour. Of the insect's identity I can have no doubt; it answered exactly to the description given by Mr. Ward in the article to which I refer. One of my captives, too, laid the curious stalked eggs for which this species is remarkable. Is it likely that the power of emitting this odour belongs to those insects only at certain seasons, or only to the males? It will be observed that one, at least, of my captives was a female.—*A. J. M. A.*

**BORAGE (p. 212).**—There can be little doubt that the hairy leaves of this plant have given it its name. The Italian *borra*, French *bourre*, signifies the hair of animals, flocks of wool, &c. Compare the English *burr*. I am surprised to find that Hooker and Arnott ("British Flora," p. 290) derive the word from *cor* and *ago*, or more directly from *Borrach*, a courageous or noble person, in Celtic!—*J. C. Rust.*

**BEE-FLOWER.**—There is a species of the Orchis, where Nature has formed a bee, apparently feeding in the breast of the flower, with so much exactness that it is impossible at a very small distance to distinguish the imposition. Hence the plant derives its name, and is called the Bee-flower. Langhorne elegantly notices its appearance:—

"See on that flowret's velvet breast,  
How close the busy vagrant lies!  
His thin-wrought plume, his downy breast,  
The ambrosial gold that swells his thighs.

"Perhaps his fragrant load may bind  
His limbs;—we'll set the captive free—  
I sought the LIVING BEE to find,  
And found the PICTURE of a BEE."

The late Mr. Jackson, of Exeter, wrote to me on this subject:—"This orchis is common near our sea-coasts, but instead of being exactly like a BEE, it is not like it at all. It has a general resemblance to a fly, and by the help of imagination may be supposed to be a fly pitched upon the flower." An ingenious botanist, after reading this article, was so kind as to send me specimens of the fly orchis (*O. muscifera*) and of the bee orchis (*O. apifera*). Their resemblance to these insects when in full flower is the most perfect conceivable; they are distinct plants. The poetical eye of Langhorne was equally correct and fanciful; and that too of Jackson, who differed so positively. Many controversies have been carried on, from a want of a little more knowledge: like that of the bee orchis and the fly orchis, both parties prove to be right.—*D'Israeli's Curiosities of Literature*, vol. i., "Natural Productions resembling Artificial Compositions."—*R. T., M.A.*



## NOTICES TO CORRESPONDENTS.

- R. H.—Ploughman's Spikenard (*Inula conyza*).—B.
- A. S.—*Cystopteris alpina*, Desv.—B.
- R. T.—*Carex paniculata*, Linn.—B.
- M. P.—The two bees are *Bombus lapidarius*. The sexual distinctions are described in Mr. F. Smith's "Catalogue of British Hymenoptera in the British Museum," part I. p. 228.—C. O. W.
- S. B.—The insect sent belongs to the parasitical family of Hymenoptera, *Ichneumonidae*. It is the *Ophion lateum*. The sting is somewhat severe.—F. S.
- H. M. H. R.—The headless humble bees have probably been attacked by some insect (and not by birds) probably when intoxicated by the juices of the Catalpa. It is not easy to give any definite information on such a point without having been on the spot. The bees are *B. leucorum* and *B. lapidarius*.—F. S.
- H. (York).—Certainly not. Ferns in sitting-rooms are not injurious to the health of the inmates.
- A. S.—Most of the terminations are diminutives or adjective forms. Consult your Latin grammar.
- M. S. H. H.—The common "Bedeguar," a gall caused by insects.
- J. P.—We are resolved *not* to insert exchanges or notes of insects, if correspondents will not take the trouble to write out the generic names in full, and distinct. The slovenly habit of only writing the initial letter we shall by no means encourage.
- F. J. W.—A common fungus (*Rhytisma acerinum*).
- J. M.—Albino varieties of birds are common. We cannot enter here upon the philosophy of the question.
- E. W.—We could not attempt to name such microscopical fragments.
- J. K. J.—Very satisfactory; thanks for offer.
- W. P. J.—Please send address to J. Britten, Esq., F.L.S., Herbarium, Royal Gardens, Kew.
- L. A. H.—We do not see how we can help you with your grievance. Unfortunately, there is plenty of quackery in the world, working through the medium of advertisements.
- A. J.—The moss referred to *Timmia norvegica* is *Tridontium pellucidum* (*Dicranum*, Hedw.; *Dichodontium*, Schimper).—R. B.
- B. H.—We should refer the *Usnea* to *U. florida*.—W. C.

## EXCHANGES.

- NOTICE.—Only one "Exchange" can be inserted at a time by the same individual. The maximum length (except for correspondents not residing in Great Britain) is *three* lines. Only objects of Natural History permitted. Notices must be legibly written, *in full*, as intended to be inserted.
- Puccinia graminis*, Bramble Brand, Bramble Rust, Rose Rust, for any other Micro Fungi.—T. G., 20, New Street, Dorset Square, London.
- Lagurus ovatus* offered for any *Pyrola* or *Utricularia* (dried).—W. H. Beeby, Lansdowne Road, Croydon.
- PRIMROSE BRAND (*Puccinia primulae*).—Send addressed envelope and any (vegetable) object of interest to H. P., 12, Margaret Street, Hull.
- Teacrium botrys*, *Lactuca saligna*, and others in exchange for rare British Plants.—W. R. Hayward, 4, Ellesmere Villas, Devonshire Road, Forest Hill, S.E.
- FOSSILS, from the Silurian Limestone at Dudley, offered in exchange for three good Diatom Slides.—Address, G. Bowen, 95, Hampton Street, Birmingham.
- GOOD SLIDES offered for Cardinal Spiders, Mole Crickets, or Stag Beetles.—Address, C. L. Jackson, No. 4, Clarendon Terrace, Haulgh, Bolton.
- MICROSCOPIC LEAF FUNGI (unmounted) for objects of interest (unmounted).—H. Durnford, Claremont House, Waterloo, Liverpool.
- DESMIDIACE.—Slides of *Pediastrum* and *Scenedesmus* for others, or material. Please send list.—Rev. John Hanson, 1, Bagby Square, Woodhouse Lane, Leeds.
- TWENTY-FIVE SPECIES of rare African Eggs, and 20 rare British, for others from all parts of the world.—C. O. G. Napier, 20, Maryland Road, Paddington.
- BRITISH LEPIDOPTERA, including *C. sponsa*, for other species, or Birds' Eggs.—Address, H. Miller, Jun., Ipswich.
- TWENTY PLANTS from the Lower Pyrenees (including *Ramondia Pyrenaica*) offered for 20 named Sea-weeds.—Address, W. P. James, Collegiate Institution, Birkenhead.

*Caradrina alsines*, *Agrotis puta*, &c., for other Lepidoptera.—J. Purdue, Ridgeway, Plympton, Devon.

FOR Scales of Dace, Bleak, Sole, Barbel, &c., send stamped address and object of interest to C. D., 187, Oxford Street, Mile End, E.

SLIDES wanted in exchange for British Birds' Eggs. List sent on application to C. B. Harcourt, 35, St. George's Square, London, S.W.

BRITISH PLANTS (dried) for other British Plants.—Send lists to J. C. Hutcheson, 8, Lansdowne Crescent, Glasgow.

LONGITUDINAL SECTION OF WILLOW.—Send stamped addressed envelope to W. White, Monmouth. Any microscopical material acceptable.

A FEW SLIDES of Fossil Sections, in Shale, from Northumberland Coal-field, for rare Parasites, Injections, or really good material.—Rev. J. K. Jackson, Talbot Street, Oldbury, Birmingham.

TRANSVERSE SECTION of Rush, and Leaf of Evergreen Oak (mounted) in exchange for other well-mounted objects of interest.—J. Sargent, Jun., Fritchley, near Derby.

SEEDS of *Verbascum Thapsus* for stamped envelope, and object of interest.—Address, E. Ward, Freehold Street, Coventry.

WANTED, British Marine or Foreign Shells in exchange for British Lepidoptera.—Address, A. M., Post-office, Faversham, Kent.

## BOOKS RECEIVED.

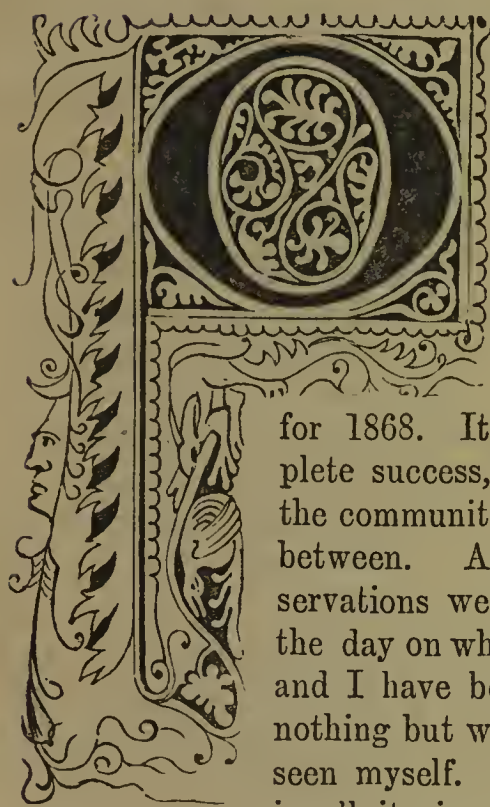
- "Annual Report of the Department of Agriculture of the United States for 1868."
- "Monthly Reports of the Department of Agriculture of the United States for 1869."
- "Third Report of the Commissioners of Fisheries of Maine, U.S. 1869."
- "The American Naturalist," for September, 1870. Vol. IV. No. 7.
- "Annual Report of the Smithsonian Institution for 1868."
- "The Indians of Cape Flattery." By James G. Swan. Smithsonian Institution, U.S.
- "The Gray Substance of the Medulla oblongata and Trapezium." By J. Dean, M.D. Smithsonian Institute, U.S.
- "Autumn Supplement to Hooper & Co.'s General Catalogue for 1870."
- "The Gardener's Magazine." September, 1870.
- "Curiosities of Mathematics, for the Instruction of Mathematicians, &c." By James Smith, Esq. Liverpool: Edward Howell.
- "The Animal World." No. 12. September, 1870.
- "Land and Water." Nos. 240, 241, 242, 243.
- "Le Naturaliste Canadien." August, 1870.
- "The Disposal of Town Sewage." By R. W. Peregrine Birch, C.E. London: E. and F. N. Spon.
- "Fifth Report of the Quekett Microscopical Club for 1869-70."
- "The Monthly Microscopical Journal." No. 21. September, 1870. London: Robert Hardwicke.
- "Bulletin of the Essex Institute." Vol. I. 1869. Salem, U.S.
- "Account of Newspapers and other Periodicals published in Salem, U.S., from 1768 to 1856."
- "Historical Notice of the Essex Institute, Salem, Mass. U.S."
- "Proceedings and Communications of the Essex Institute." Vol. VI. Part 1. 1868. Salem, U.S.
- "The American Entomologist and Botanist." Vol. II. No. 10. September, 1870. St. Louis: R. P. Studley & Co.
- "Vargasia: Boletín de la Sociedad de Ciencias Físicas y Naturales de Caracas." No. 7. 1870.
- "The Canadian Naturalist." Vol. V. No. 1. Montreal.

COMMUNICATIONS RECEIVED.—W. R. T.—H. E. W.—A. H.—W. H. B.—C. F. T.—C. G. B.—H. P.—W. W. W.—J. B.—M. J. T.—J. F.—J. G. B.—H.—J. W. L.—A. S.—T. G.—B.—M. J. B. W.—A. A. M.—M. S. H. H.—R. S. H.—J. B.—H. P.—R. H.—J. R.—A. T.—W. R. H.—E. T. S.—H. D.—G. B.—W. B.—J. W. G.—C. L. J.—R. A.—T. W. W.—H. C. L.—J. S. W. D.—H. M., Jun.—F. T. M.—J. B.—W. A. O'C.—F. J. W.—J. M.—S. B.—A. E.—E. T. S.—J. P.—T. W. R.—H. R.—W. P. J.—T. W.—S. A. H.—E. B. F.—A. M.—H. J. B.—J. R. S. C.—W. W.—J. K. J.—G. H. H.—J. C. H.—C. B. H.—S. I.—A. S.—C. D.—H. G.—E. W.—J. H.—A. C.—G. G.—J. S.—C. O. G. N.—R. A.—B. H.—A. J. M. A.—L. A. H.—J. C. R.—W. W. S. B.





## A N T S.



ON July 12th, 1870, I established a formicary from the description given by Mr. Frederic H. Ward, at p. 177 of the volume of SCIENCE - GOSSIP for 1868. It has been a complete success, and the deaths in the community were few and far between. Almost all my observations were written down on the day on which they were made, and I have been careful to note nothing but what I have actually seen myself. My formicary was, in all its important details, precisely the same as Mr. Ward's. It was placed on a stand about three feet from the ground, which was a convenient height for sitting to observe the ants, and it was so situated that the sun would shine on it in the course of the day. It should be moved as little as possible, and no one but oneself should be allowed to meddle with it.

Mr. Ward recommends carrying the formicary itself to the nest to stock it; but, finding it too cumbersome to do this with success, I collected the ants first in a covered can, and thence shook them out into the formicary. The species I observed was the Brown Ant (*Formica fusca*). They have no sting, and can only nip with their mandibles, which gives but a momentary smart; though stocking a formicary with *F. rufa* would be a delicate, not to say a dangerous operation; for they have a veritable and a very painful sting; nevertheless, I hope next year to keep under observation both these and *F. flava*.

I originally introduced nearly twenty cocoons and about one hundred ants. Their first impulse was to escape, and they crowded down to the moat with such impetuosity that many fell into the water, and for some time I was fully employed lifting them

out. I then gave them a lump of moistened sugar, which was instantly covered with eager ants, and in about an hour the colony began to settle down. Many were busily engaged in carrying the cocoons into shelter among the stalks of the grass, whilst others began to dig in the depressions I had made on the surface close to the glass sides. Each of these depressions they first worked downwards in a semicircle, emerging again about an inch farther on. From the centre of this curve they would then sink a perpendicular shaft, thus making two outlets to one burrow. The number of their tunnels is astonishing; but since many of them are narrow, it is necessary to make up by their multiplicity, and most were in constant use. It was curious to see how two or three ants would work a couple of burrows from opposite directions, and yet would make them both exactly meet. If one had been making a burrow right from the bottom of the case to the top, and then attempted a branch passage close to the surface, it would still carry the earth all the way down and through the interior as it had been accustomed to do, instead of along the inch or so of road leading to the top. And if one ant was going down a narrow cutting with a load of earth, and met a companion coming up to dig, the latter would not relieve him of his burden, but they would both lose no end of time and strength struggling to pass.

I nevertheless once saw an ant who was coming up with a very large load meet another, who bit off half and carried it up for him; and on a second occasion one relieved a companion of its entire load, which was of very large dimensions. But I never saw any other instances. Each ant seldom digs for long at a time; and I have frequently seen them come and relieve others which were then at work. When the colony was very busy, I often saw a worker come down to the water, dip his jaws in and drink, and run up again, and continue his labour.

Mr. Ward remarks that they appear to be as lively at night as in the day; but my ants at any rate did nothing of the kind. As evening draws on,



a stillness and quiet comes over the whole community, and I have frequently watched for some time and not seen a single ant appear above-ground. And I have always observed that burrows which perhaps would be extended an inch or two in the course of the day, had increased in length but very little on looking at them in the morning. I also have found that when two or three ants begin a passage, they will almost always finish it before they commence a second.

They can walk backwards nearly as well as forwards. For since they always begin by running their tunnels very narrow indeed, and widening them afterwards, they are forced to walk backwards with heavy loads till they come to a portion broad enough to turn in. After a time the formicary got riddled with holes, and little heaps of earth were raised in all directions. The surface of the ground consisted to some depth of nodules of earth, the result of the ants' excavations, and some grains of barley which I had laid on the surface, got so covered that they vegetated luxuriantly. At any time they could be induced to make a new burrow by running a stick a short distance into the ground, the hole made by which would be directly utilized and extended. Subsequently, the surface was so beset with holes that a spot for fresh excavation was hardly to be found.

They sometimes, as the most expeditious mode of getting rid of the earth, drop it down one of the adjacent holes; this they constantly did with one shaft which they had sunk so big that I could almost put my little finger down it; and no sooner had one ant cleared it out, than another filled it up again. As a rule, however, they are very careful to keep the entrances to the holes clear, and I have seen an ant remove all the pellets from around one outlet, which he regarded as dangerously close. After bringing earth out, they always carry it far enough off to prevent its falling back into any of the holes, and pat it down with their antennæ; and whenever I have either purposely or accidentally thrown a little earth down one of them, the first ant who discovered the dilapidations would set to work and rapidly repair them. Every now and then an ant would travel to the edge of the glass with a piece of mould, and would drop it over on to the platform with no apparent reason: and I have found that, after having deposited their burden, they almost invariably return to the right hole, and if not, instantly discover their mistake, and retrace their steps.

The constant traffic perceptibly wore the paths wider, although never actually dug at. The less-used ones did not increase: for instance, those on the side of the formicary which faced the wall, in which there was little doing, remained the same size; whilst most of those in front, facing the light, grew two or three times their original breadth. One

of the outlets from the interior, which was very much used, they made so wide that they appeared to have found it necessary to leave in the centre a slender round pillar to act as a support. This, however, gradually wore away; but as they continued their excavations, they formed a precisely similar one a little further back.

There was one large outlet on the surface by the roots of the grass, through which the females generally appeared, which had a slanting walk gouged down to it, forming a very easy entrance. This was the great opening into the centre of the colony.

I found from the nest that I cut open to procure my ants, that the chambers in which they store their cocoons are pretty nearly round, and much resembling the impression made by the tip of the finger in moist clay, though their eggs were occasionally laid in long, low, and narrow galleries.

I made a point of trying numerous experiments to see what kinds of food they would eat. Beef and mutton, when it was cooked, they would have nothing to say to, nor would they eat rice, strawberries, raisins, currants, cherries, plums, pears, apples, jam, or bread, preferring pure sugar. They will often carry below both fresh barley and wheat, husking it and removing it in fragments; but I never saw them actually eat it. Raspberries, worms, and honey they would sometimes taste. They will generally suck with avidity any kind of flesh, as I have given them portions of owls, partridges, and sparrows, as well as raw beef and mutton. I have found, however, that food which they will refuse at one time they will eagerly eat at another. Their really favourite food is soaked lump sugar. Whenever I removed the remains of a lump which they had finished eating, I found a hole burrowed immediately beneath it, and I have often seen the ants inside the lump working away and removing little fragments. It is very evident that these shafts are sunk to the lower regions to facilitate the removal of sugar to feed the numerous colony below.

Fond as they are of sugar, they do not prosper without any animal diet at all. Once when they had been without any for some time, I put in a small portion of the flesh of a sparrow. Now for some weeks little or nothing had been doing in the formicary, and few ants ever appeared for any length of time; but no sooner had I let go the fragment of meat than, one after the other, at least half the colony poured out of their holes, and the food was rapidly covered with eager and hungry ants. They continued eating more or less the whole day, and a new life sprung up; ants were swarming in all directions, and burrowing was renewed with vigour. Since then I have taken care not to let them go long without animal food. I think, however, their temporary inactivity may partly be accounted for by the absence of females at that time.

After sucking a piece of flesh, nothing is left but a



species of dry hide. They appear glad of any portable food which they can carry down below with greater ease for the benefit of the numerous males, females, and young domesticated there; and for this reason I kept them supplied with a little brown sugar, which afforded easy transportation. I often gave them small dead flies, all of which soon disappeared, and I noticed that they were always carried down the same burrow. I once gave them a full-grown house-fly, which a single ant, by dint of great exertions, lifted up and dragged two or three inches to the hole, into the opening of which he threw it; the fly, however, stuck in the centre and it would go no further. Several ants then came and had a try at it: one ant vainly attempted to pull it out again; another dug to enlarge the opening; whilst a third reduced the fly's dimensions by cutting off its legs and wings. Their united efforts were successful; after two or three hours' hard labour it slowly sank beneath the surface.

I have two or three times seen them attack, and subsequently devour, flies which had incautiously found their way a short distance down one of the holes. I witnessed a most exciting contest when a very large fly got completely down into one of the galleries by the glass: two or three dozen ants rapidly emerged from the neighbouring exits, and setting upon the fated insect, by repeated bites they soon compelled it to succumb. It was too large, and the space was too confined to allow them to remove it as it was, so it was eaten on the spot, and I was able through a lens to watch very perfectly the whole process. I saw an ant several times with great labour cut off small portions of the meat and convey it inside for the benefit, I suppose, of the females, &c., who resided there. Wasps they were also very fond of, and several they completely gutted, once even taking below the entire abdomen of one of these insects. I generally found their empty husks either dragged to the furthest confines of their abode, or else thrown right over into the water. I also feel sure that they have strong cannibal propensities, and eat the sickly or maimed members of their own species, as all the dead ones that I have found in the water have been much shrunk and shrivelled, and one large female which they threw in turned out on examination to be nothing but an empty shell. Huber remarks that "the attachment of the labourers to the females would appear to continue after their death; for when a pregnant female dies, five or six labourers rest near her, and during several days brush and lick her continually, either in token of lasting affection, or that by these means they hope to reanimate her." Any one who has seen ants devouring a wasp will at once perceive that Huber mistook their cannibalism for affection for their dead. I have several times seen two or three live but sickly ants disappear down the provision-hole, borne in the jaws of a companion.

I have noticed that when I put down a fresh eatable, the first ant that comes to it merely touches it with its antennæ, and instantly runs down the nearest hole. A minute or so afterwards several will pour out, and march straight to it. This looks as though the one informed the others. I once tried whether sherry would intoxicate them, but though one fell right into it, he walked away when dry, just as steadily as usual, though I have frequently seen wasps and flies, after falling into beer or wine, fly away, showing every symptom of inebriation.

Though I had often read that ants sucked the honey-dew from the Aphides, or plant-lice, I had always regarded it as one among the many fables that have been published about them; but noticing some red ants running about on an oak-gall, which was infested with clusters of these creatures, I placed it in my case. Two or three ants ran upon it, and I could see them apply their mouths to the abdomens of the Aphides, one after the other, agitating their antennæ the whole time. Evidently it neither killed nor hurt the Aphides. I also tried them with lice from the ivy, with the same result, and ants would run at intervals throughout the day to regale themselves on the honey-dew. Though writers have affirmed that they keep Aphides in their nests to milk as it were like cows, I never saw mine make any attempt to remove them from where I had stationed them. My diet was evidently acceptable, as they kept strong and healthy, and, when anything very tempting was provided for them, their abdomens would visibly distend as they ate. When they were hard at work, a great deal more food would be consumed than at other times, and, as autumn drew on, they ate little or nothing.

My ants were very careful to keep their domain clean and neat. All remains of dead insects, little fragments of meat, cases of cocoons, and dead ants, were taken down the glass, to the edge of the moat, and dropped in; and legs, earth, wings, and so on, were always floating on the surface of the water. They will often carry enormous loads when engaged in this occupation. I have sometimes seen lying there the entire abdomen of a wasp, and, once finding a female ant drowned in the tank, I replaced it on the platform, upon which a neuter took even this heavy load, soaked it as it was with water, and, dragging it to the edge, threw it in again. In spite of their strength, their tread must be wonderfully light, since they will walk heavily burdened up a crumbly and perpendicular shaft without displacing a grain, whereas, if I touched it ever so lightly myself, it would crumble in; in fact, it has always been incomprehensible to me how the whole structure keeps together.

Once, finding a dead ant in the water, I placed it on the edge of one of the glass sides. As soon as it was discovered, great consternation seemed to



prevail. Ant after ant stroked it with their antennæ, and touched those of their companions. None attempted to remove it, till at length one arrived who seized and made off with it, and, after having for some time been very undecided where to put it, chance at last led it to the platform, from which, unhesitatingly, it dropped it into the water. I replaced it two-and-twenty times, and the same scene always recurred. They seemed at last to think that this unusual state of things arose from their not taking sufficient pains to put it in a remote enough place, and they used the utmost care, dropping it into the water, and taking it out again, only to submerge it in a fresh place, before they were satisfied. They are rather addicted to drowning companions, who, though evidently unwell, are far from dead. After having done anything of this kind, they go through an elaborate cleansing process, and I have seen an ant in a secluded burrow brushing and combing itself all over, and especially its antennæ. A live ant once had a little shrivelled and dead companion attached to it by the antennæ; as the former was running about in great distress, I with some difficulty released him.

Having introduced a red ant into the formicary, it ran about unmolested for some time, till it went down a hole where a brown ant was at work. The latter, as soon as he saw it, seized it round the waist, and, rushing with it up to the surface, they rolled over and over together with the greatest fury; the brown ant then let go and resumed its work, the other walking quietly away. Some time after I put in a second red ant, who, being set upon by three of my colony, was bitten and pulled at with great violence, but the result of it was not very clear, as, on separating them, they ran off uninjured. The red ants are always much frightened when they see the quarters they have got into, and attempt no defence. Among themselves the brown ants are very friendly, and I have never seen a quarrel of any kind. They cannot bear any intrusion, and would fight to the last in the protection of their dwellings. I once inserted down a hole the little steel spatula with which I helped ants out of the water, and it was entertaining to see the first ant that came draw itself back, and make repeated darts at it, vainly trying to bite the metal. When they attempt to nip you, they draw up their legs, double up their body, and seem to throw forth all their strength, and it requires a sharp knock to make them loose their hold. When in cleansing the glass a little earth had fallen down a burrow, they immediately blocked this opening completely up, and let it remain so for two or three days before they ventured to reopen it. They evidently expected some further attack from the enemy above.

Since the end of August they many times have seized very savagely some of their ants, fresh from

the cocoon, and have thrown them into the tank, and drowned them. Probably they were sickly and weak, from being hatched too late in the season. In all my experience I never found that they objected to additions from the old nest, though I have added some at least six weeks after the foundation of my colony. Yet if I placed in the formicary, as I did several times, a specimen of the same species, but from quite a different nest, it created very great excitement, and the intruder was shortly killed and thrown into the water. I once thus saw two ants floating on the surface fast locked to each other; one was dead, and the other nearly so, having lost a leg and part of an antenna. One combatant, in trying to drown the other, had fallen in himself.

If ants are determined to escape, as about a dozen fresh ones I put in were, scarcely anything will keep them in. I found that several got out where the tin trough joined the platform, by getting into the crack, going beneath the tin, and coming up on the other side. I therefore covered the crevice with paper; but they were not to be baffled, and, after about six hours' hard labour, one of them successfully bit a hole in the paper large enough to pass through. Even if the water got dusty, these adventurous ones would take advantage of it, and manage to cross without sinking, and, I think, in the end, most of them got away. Once a small blade of grass fell across the water without my perceiving it, but it was directly discovered by the ants, and my attention was drawn to it by seeing them, one after the other, crossing this accidental bridge to the opposite bank. An ant seems sometimes seized with a suicidal tendency, and I have twice seen one, time after time, throw itself into the water, and, although constantly picked out and removed to the grass in the centre, with slow and feeble steps it always went direct to the tank again. Whatever the cause was, the craving for water was intense.

The curiosity they exhibit about any fresh object is great. One day when they were very quiet, and few above-ground, I took the opportunity to repaper the platform, to pump the water from the trough, and to clean it out. Though it was dry about half an hour, only one ant came down to it, yet when all was completed, and the moat refilled, in about ten minutes there was a constant stream of ants descending to look at the alterations which they had so rapidly detected. Whenever one ant meets another, they cross antennæ, and pass on, and I have never seen two ants actually meet without giving this salutation. I noticed one ant which had been deprived of its antennæ; it was almost unable to walk, and constantly fell into the water, and evidently had no perception of where it was going. Some of the ants are far larger and stronger than others.



They are of three kinds. Males or drones, females, and workers. The two first appear to have to do only with the production of eggs, and apparently take no share in the nursing. The males are hardly so big as an ordinary neuter, but are of a darker colour, and possess large and spreading wings. The females are nearly as large as an ordinary wasp, and have very lengthy wings indeed. When I stocked my formicary, I put in neither males nor females, trusting to some of both kinds appearing from the cocoons; and, as several of these were half as large again as the others, I do not doubt that it was from them that the females were hatched. My first female appeared on the 2nd of August, and my first male on the 13th, and, in the end, I had over a dozen of the former, and still more of the latter. In fine weather, the males and females might often be seen poking their heads out at the opening by the grass, and occasionally walking a few steps out; but they always appeared dazed at the sight of the outer world, and it was evidently the object of the workers to prevent them from straying, for I have many times seen them, when a female has thus emerged, give it a push in front, or a kind of bite behind, upon which it would turn round and quietly disappear. They once even dragged bodily below, one of the males which had wandered away, and would not obey their usual signals. The males and females might often be seen lying in a burrow, perfectly motionless, and enjoying the warmth, whilst neuters were hard at work all around them. Once when I touched with my spatula the antennæ of a female which was looking out, it was wonderful to see the rage with which one of the neuters rushed to attack the assailant.

The great instinct of an ant, and that which overcomes all others, is care for its cocoons. Turn over an ant-hill, and the first thing you see are excited ants running in all directions, carrying them into shelter. Late on the evening of the day on which the ants were so attracted by the dead sparrow, I added about thirty cocoons from the old nest. It was wonderful to see the eaters forsake the meat, the workers leave the burrows, and the stragglers their amusement, and one and all setting to work with a will; in ten minutes not a cocoon was left above-ground. That they take them down deeper in the nest in the evening or in cold weather, I have repeated instances of. I have often turned over an ant-hill at both of these seasons, and not a cocoon was to be seen. I have gone deep, however, and have found numbers; but when I have opened one, on a warm day, I have always seen them in clusters close at the surface. Heat is evidently necessary for the due hatching of ants' cocoons. It was on the 20th of July that they first brought out a few cocoons, and laid them in the passages against the glass. When the time

for removal came, this office was told off to a single ant, although many others were swarming in all the passages. This ant carried the cocoons about half the length of the formicary, and, depositing them just inside a hole, went for his next load. I always knew him by the unusual pace at which he hurried along. From this time until they were all hatched the cocoons appeared almost whenever the sun shone upon the formicary, numbers of ants helping in the operation. Some were kept out an hour or more, and others only five or ten minutes.

Once, when it was a cloudy day, I took a candle and fastened it close to that portion of the glass at which they generally put their cocoons. They felt the heat directly, and, in ten minutes, more cocoons were out than I ever saw before. Males, females, and neuters were abundant; and, at one time, the passages behind the candle were literally black with the clusters of ants swarming to the warmth. On the 8th of September, when the colony was very lively from the warmth of a candle, I had the good fortune to see a young ant actually leave its cocoon. When I first saw it, it was half out of its case and had there stuck. One neuter had fast hold of it, while another pulled at the remainder of its covering. But it was a difficult matter, and it was a long time before, by degrees, they got the young one out. A little kind of string, however, still remained joined to one end of the cocoon, and entangled in the legs of the embryo. After much trouble this was cut through, and the ant was at last safely and completely freed.

I found that if I altered the position of the candle to the right or left, the cocoons in a very short time were taken after it. When doing this the passages were often so crowded with females that I have often seen the neuters take a roundabout way to escape the crush. When the sun was shining, and the mullion of the window cast a shadow over the formicary, the cocoons were generally carried in; and, when this shadow had passed, they were again produced. Their number slowly but steadily decreased week by week, and the last was hatched on September the 20th, only, however, to be killed by its pitiless nurses. On August the 31st I cut open and examined in the microscope some of the cocoons. I found a perfectly-formed ant inside. It was quite white, with the exception of the mandibles, which were tinged with brown, and toothed with about eight sharp teeth, alternately long and short. The insect lies with its abdomen at the little black spot which is always found at one end of the cocoon.

On Tuesday, the 20th of September, I was summoned to see a vast congregation of brown ants (*Formica fusca*) on an old elm stump. I found the males and females just preparing to swarm. All the neuters were in the most intense excitement, and were running all over the stump with the greatest celerity. The females were climbing to



commanding spots from which to take their first flight, and the workers made little or no attempt to keep them back. The females had altogether altered in appearance, and ran about brisk and lively, their wings stretched out firm and strong, and ready for use. When the right moment came, each would launch itself into the air, and, flying with a quick and high flight, would soon be lost to view. They went one by one, and not in a simultaneous swarm, as many have asserted. The females, with hardly an exception, left before any of the males. When the latter ventured to move, hundreds crowded out, and, one by one, rapidly left their abode. They did not fly as far as the females did. By five in the evening all were gone except a small party, which left the next morning. The whole process took about three hours. My own ants swarmed on Sunday, the 25th, and on that occasion also the females left before any of the males.

These are the most important of the notes which I have made from day to day throughout the summer; but much is yet to be learnt. And since such fables as Addison published on the subject in the *Guardian*, a hundred and fifty-seven years ago, are still being recapitulated in the present day as grave facts, it is obviously high time, before another century and a half have passed away, to dispel this mist of errors with the light which patience and careful observation will alone supply.

EDWARD FENTONE ELWIN.

*Bopton, Norwich.*

## BIRDS OF PARADISE.

EVERY one is familiar with the beautiful feathers of the Bird of Paradise; is every one familiar with the circumstances which give them their dainty appearance? To understand this, let us examine the structure of any ordinary feather. Pull it to pieces carefully, and it will be seen to consist of several distinct parts, of which the quill and the shaft form the central axis—the part, in fact, grasped by the hand when writing with a quill pen. On each side of the shaft is the really “feathery” part known as the vane or beard, one side of which is usually stripped off before using a pen. If we take this stripped-off part, we shall find that it is still divisible into two portions; to wit, the barbs and the pinnæ; the barbs being the narrow flat membranes which project from the shaft at an acute angle; the pinnæ, minute hairs projecting in their turn from the barb. An examination by the aid of a microscope shows that the pinnæ on one side of a barb are totally different to those on the other side; for, while the one are either quite simple, or slightly toothed, the others are fitted with a row of strong hooks. In their natural condition, the hooked pinnæ of one barb overlap the toothed pinnæ of the ad-

jacent barb; and thus, by this beautiful arrangement—so evident an instance of providential design—the different parts of the feather are firmly connected together, and the bird is enabled to beat the air with its wings, or, in other words, to fly.

It follows that where these tiny hooklets are wanting, the bird can never “cleave the liquid air;” a circumstance which may be tested by examining the wing of an Ostrich or Emu; for lack of this important piece of mechanism the constituent portions of the vane are unconnected; the pinnæ being of the lightest possible material, are moved with every breath of wind, and form with the barbs and curved shaft delicate combinations, the grace and elegance of which it is impossible to over-estimate. The more loose and fling they are—in fact, the less fitted they are for the ordinary purposes of a feather—the better are they adapted for ornamentation. It is, then, to this peculiar structure of their feathers that the Birds of Paradise owe their fame. Their wings, indeed, are as the wings of other birds; but from the shoulders of some and from the backs of others spring tufts of feathers, in which the hooklets are altogether wanting and the pinnæ are largely developed; the tufts therefore arch over or droop downwards with a floating wavy motion indescribably graceful.

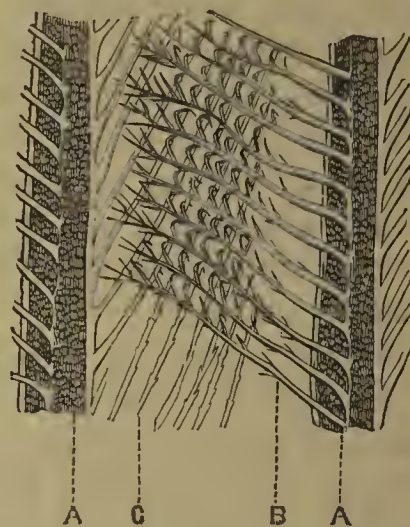


Fig. 202. Barbs of feather.

The fact that the skins of these beautiful birds always reach the great centres of commerce without any trace of legs or feet gave rise to a curious error, which even the great Linnæus sanctioned by giving the name of Apoda (footless) to the species with which he was best acquainted, the Emerald. It was believed that these birds exist without any legs at all,—so firmly believed, that it is on record that Aldrovandi, the Italian naturalist of the sixteenth century, actually came to blows with a brother ornithologist, Pigafetta, on the subject, the latter daring to uphold the fearful heresy that Birds of Paradise might possibly be gifted with those useful instruments! The Aldrovandists, however, were supported in their belief, not only by the logic of facts—the positive absence of leg and foot—but



also by the tales which accompanied the deceased birds from their distant and little-known homes. It was stated that they come direct from the celestial Paradise: hence, by the way, their universally-accepted name; that they live solely off the dew of heaven and the vapours floating in mid-air, and that they never touch the earth. If some doubting naturalist ventured to inquire how the species could be continued under such singularly unquiet circumstances, an abundance of theories cropped up in answer. By some it was asserted that the female retired yearly to her real home, Paradise, whence in due time she returned surrounded by a youthful family. Others taught, that the eggs were deposited on the back of the male, who was furnished with a cavity for the purpose, and that they were hatched by the female as the couple floated on high; lest, however, she should, like Humpty-dumpty, "get a great fall," she knit her mate's long rich plumes among her own more sober feathers, so as to form what may well be called a true lover's knot. By a few it was thought, that the female simply carried the eggs under her wings; though how she managed, first to deposit, and then to retain them there, in her never-ending flight, "deponent saith not."

An old French naturalist, Vigneul-Marville ("Mélange d'Histoire Naturelle") accounts for the absence of the legs in a less imaginative, but not less absurd, manner. "When a Manucode is found dead at the foot of a tree, it is always legless—a circumstance which has given rise to the belief that the birds are so born. But this is not the case; the truth is that the ants which abound in those countries, as soon as they come upon a carcase, invariably attack the legs first; hence it comes to pass that the bodies sent to Europe appear never to have had legs at all!"

It is now known that the absence of the legs is simply due to the rough manner in which the skins are prepared by the natives, who cut them off, as not being needed for ornamental purposes.

In the accompanying figure, A represents two barbs, from one of which spring a series of pinnæ (B), with hooks which overlap and catch another set of pinnæ (C) with simple teeth.

Harre.

W. W. SPICER.

#### THE COLOUR OF INSECTS DEPENDENT ON THEIR FOOD.

THAT the colour of insects is much influenced by the nature of the plant on which they feed, is unquestionable. If the reason of this influence cannot be pointed out, nevertheless it is a well-ascertained fact that certain larvæ do assume a tint corresponding to the plant on which they

have their abode, according as the latter is light or dark, brightly or sombrely coloured. This is particularly the case with the caterpillars of the Loopers (Geometra), which are sometimes green, like leaves and thin petioles; sometimes grey and brown, answering to the markings on the bark and twigs of trees. Examples of the former are found in the genera *Aspilates*, *Cidaria*, and *Acidalia*; of the latter in those of *Gnophos* and *Boarmia*. Besides, most of the Loopers have this peculiarity, that when alarmed by a touch, they assume an upright or oblique position; thus having all the appearance of a broken twig, and in this attitude they will remain immovable for a long period; so that many of them can scarcely be distinguished from the plant on which they are resting; indeed, to a superficial observer, they appear exactly like a bit of woody substance.

The polyphagous larvæ—those which feed on a large variety of vegetables—take their colouring from the plants on which they have always subsisted. For instance, the caterpillar of *Amphidasis betularia*, Hüb.—a yellowish-green or bark-colour when on the birch-tree, becomes ash-grey on oak, brown on elm, and on willows and poplars yellowish-green, passing into chestnut on the upper surface.

In the Bombycid group there are, among others, *Liparis monacha*, which is a light grey, nearly white, on the Scotch fir, a dark grey on the spruce, and almost black on the larch. Again, the caterpillars of *Catocala* can scarcely be distinguished from the bark of the ash, oak, poplar, or willow, into the fissures of which they retire during the day.

The Noctuids, which, as in the case of the *Agrotis*, subsist entirely upon the roots of grasses, are invariably earth-coloured. The naked larvæ of *Cucullia tanacetii* lose their white ground-colour and put on a yellow tint, as soon as, abandoning the leaves of the mugwort and tansy, they confine themselves to the flowers of the latter. In like manner, we are assured by Koch that the larvæ of *Chesias spartiaria*, Hüb., which subsist on the flowers of the broom (*Sarothamnus*) are yellow, while others which attack the leaves remain green.

In all these instances, the change of food-plant affects the colouring of the caterpillar only; but there are besides cases, and those not rare, in which the perfect insect undergoes important changes from the same cause, not merely in the ground-colour of the body, but even in the markings of the wings. For example, the moths of *Chelonia caja*, *Ch. villica*, and *Ch. antica*, whose larvæ have been fed from their youth upon the garden lettuce, are of lighter hue and altogether more simply marked than when they have been supported on the nettle or the deadly nightshade (*Atropa Belladonna*). It is found, too, that the caterpillar of *Liparis monacha* which has been supported on an apple-tree produces a moth of a much paler hue than



when its home has been on the Scotch fir. Lastly, with regard to *Smerinthus tiliæ*, of which there are two marked varieties, with a green and a red tint respectively, it appears that the first proceeds from larvæ fed on the leaves of the lime-tree, the second from those which have chosen the elm for their food plant.—MÖLLER, *Die Abhängigkeit der Insecten von ihrer Umgebung*.

#### NEW INTRODUCTIONS.

WHILE acclimatization societies are introducing useful animals into their respective countries, why should not an effort be made to furnish the British isles with some of the lowlier, but not less interesting, forms which are scattered over the continents of Europe and America, those "things of beauty" with which Nature has gifted our neighbours, and which she offers to any who will reach out their hands to receive them? Of course I refer only to such animals and plants as we may reasonably expect, from the circumstances of their life-history and the nature of their habitats, might be induced to make themselves at home in our "tight little island;" and, when once established, to hold their own in the great struggle for life. France, for example, might send us that very handsome bee, *Xylocopa violacea*; or America its near relative, *X. virginica*, so like to, and yet so different from, our humble bees. Larger than these last-named insects, the bright purple wings and body of *violacea* would make a pleasing variety in our gardens, while its curious wood-boring habits would give it an interest in the eyes of the entomologist. It is by no means uncommon in the north of France.

Again, while speaking of bees, is there any just cause or impediment why we should not see the stingless bee of Australia, or its equally innocuous relative of South America, established in our hives? We have succeeded in fixing among us an Egyptian apis (*A. fasciata*), may we not be as fortunate with a Brazilian melipona (*M. scutellaris*)? I am aware that nests of this last-named insect and of *Trigona pallida* have been introduced into Paris without success. But this is no argument against the possibility of establishing them in, at least, some parts of England. On the contrary, their having reached France alive is rather a source of encouragement, as showing that these delicate little creatures can be transferred with safety from a distant continent to the shores of Europe. The individuals in question were landed in a notoriously exhausted condition, and placed at once in the heart of a great city, where the means of procuring food were decidedly limited; being confined, in one instance at least, to a small garden in the Rue St. Lazare. Even under these unfavourable circumstances, how-

ever, the little half-starved colony survived from May to near the end of September.

Of less useful members of the same order—such as *Polistes gallica*, with its dainty paper-like nest attached to a twig—more than one might, no doubt, be persuaded to make its home with us.

Both continents, European and American, could supply us with many an interesting butterfly and moth. It would be impossible to enumerate a thousandth part of the treasures which might reward our enterprise. The Northern States and Canada could send us numerous large and handsome species to decorate our fields and gardens. And why should we not obtain from spots nearer home the lovely *Apatura ilia*? Were it once established, it would prove of more interest even than our native Emperor (*A. iris*); not that it exceeds it in beauty, but because its habit is to frequent low bushes, instead of tantalizing the collector by skimming over the summits of lofty trees. The less brilliant *Vanessa prorsa* is also worthy of a place in our fauna; as are also those grand moths, *Aglia tau* and *Saturnia pavonia major* (or *S. piri*, as more wisely named by Hübner), the finest of all the European moths, measuring not less than five inches across the wings.

But the insect of all others which we should seek to acclimatize is the Fire-fly. I am not speaking of the glorious light-producers of the tropics—*Pyrophorus noctilucus*, with its red and green lamps, *Photuris versicolor*, or *Pygolampis xanthophotis*, in which the phosphorescent colours are respectively a rich yellow-green and as rich an orange. These, and such as these, are for ever placed beyond our reach. But I know of no reason why we should not enjoy the milder effulgence of the Lampyrids inhabiting Canada and the United States. These species—and there are several of them—are closely allied to our own glowworm; but the female, being provided with wings, is not compelled to crawl slowly over the damp soil, but flits with her lord among the boughs of a tree, or dances over the surface of a meadow. "In Canada," says Mr. Gosse (*Romance of Natural History*), "I have seen the whole air, for a few yards above the surface of a large field, completely filled with fire-flies on the wing, thicker than stars on a winter's night. The light is redder and more candlelike than that of our glowworm; and being in each individual alternately emitted and concealed, and each of the million tiny flames performing its part in mazy aerial dance, the spectacle was singularly beautiful."

These remarks I can fully endorse from my own experience. A more lovely or more striking sight it is impossible to imagine than a swarm of lightning bugs—as our unpoetical cousins across the Atlantic are wont to designate them—sparkling like fiery precious stones among the bushes, now exhibiting, now hiding their fairy torches, as they



change their position. These insects defy the extreme cold of New England, why should they not bear the milder temperature of Old England?

I mention these as samples; a vast number of others might be named as worthy of our notice, either for their beauty or their usefulness.

Among the smaller Vertebrates are many whose naturalization would well repay the trouble incurred in establishing them in their new homes; to wit, several of the frogs and lizards: our native insect-feeders are not so numerous, that the addition of a few more would interfere with those already existing.

It is scarcely perhaps necessary to speak of plants. The numerous "escapes" which are gradually finding their way into our flora, prove how many foreign productions are willing to take kindly to our soil if permitted so to do. In this way the not very interesting *Galinsoga* and *Claytonia*, the pretty *Veronica Buxbaumii* and the handsome *Impatiens fulva* have in recent years acquired the rights of citizenship in Great Britain; and at this moment, at least one other plant, a near relation of the Saxifrages, *Tellina*, is in process of being naturalized.

Why should we not guide and encourage this tendency, and invite to our shores such plants as are signalized by beauty of form or peculiarity of structure? There is no insurmountable barrier that I am aware of to the introduction of various ground orchids, or to what are commonly called "Alpines," many of which now almost literally "waste their sweetness on the desert air."

America could furnish us with many a plant, terrestrial and aquatic, which—whatever florists might think of them—would form a welcome addition to the scenery of our lanes and byways. Who that has travelled in the States or Canada can forget the graceful *Houstonia cærulea*, so common in fields and waste places, which it enlivens with its dainty blue flowers throughout the spring and summer? It is known, by the way, in different parts of the States by the rather opposite names of Quaker girls and Ballet girls! Among aquatics there is the Waterlily (*Nymphæa odorata*), a good deal like our own *Nymphæa alba*, but with flowers somewhat larger, of a pinker tint, and diffusing an odour which justifies its specific name.

Lastly, as our Lady's Slipper (*Cypripedium Calceolus*) is fast disappearing, if it has not been already eradicated, might not its place be in time supplied by its hardy relatives, *C. spectabile*, *C. pubescens*, &c.?

There is no doubt, though it may sound rather paradoxical, that an introduced plant will often flourish more freely, and altogether succeed better than a native: witness the Water Thyme (*Udora canadensis*), which is now far more frequently met with in England than in Canada; or the White

Clover (*Trifolium repens*), which is fast destroying the native ferns of New Zealand; our common furze (*Ulex europæus*) has spread with great rapidity over the island of Madeira.

I do not imagine that the veriest purist could object to seeing new objects of beauty or interest added to our fauna and flora. It does not touch the question—be it remembered—of attempting to supply deficiencies in rare species by the aid of the foreign collector. I am no advocate of *that*, as I believe the principle to be altogether wrong. But that is no reason why our senses should not be gratified and our scenery enlivened by the presence of new species, about whose introduction there could be no mistake, as its date would be carefully recorded.

Havre.

W. W. SPICER.

### SMOTHER FLIES, CHOLERA FLIES, WINGED APHIDES.

THE swarms of flies with which we are now tormented, flying into our mouths, flying and settling upon everything, are the last autumnal and winged brood of the aphides, chiefly of the cabbage and turnip crops. The suddenness of their appearance in the winged state is no new phenomenon. Several weeks ago complaints were made to us of black grubs which were found by thousands at the bottom of the stems of vegetables, which proved to be larvæ of lady-birds, or *Coccinellæ*, which had been feeding upon the plant-lice which had already attacked the plants in vast quantities. The wonder at the present time is the immense number of the winged flies; but this is easily explained, first by the long-continued dry and hot weather, and secondly by the prevailing east wind, which, although not of itself producing the flight of flies, has evidently a peculiar atmospheric effect in promoting their extra development. The singular but well-known history of the aphides is sufficient to account for even a more extensive visitation of these creatures. The males are only produced in the autumn; they are winged, as is also the case with the brood of females simultaneously produced. After a single pairing, the female commences to lay eggs, and in the following spring to bring forth living young. These wingless young, without further impregnation, also bring forth wingless progeny; and this state of things goes on through the spring, summer, and early autumn months, until males are again produced, to repeat the cycle of existence. Now it has been ascertained that there are as many as from twelve to twenty generations in a single year, and, according to Kyber, a female aphis has been known to continue breeding for four years under very peculiar circumstances. We may, therefore, place full confidence in Reaumur's statement, that a single female aphis may be the progenitor of 5,904,900,000 de-



scendants during the year of its ordinary life! Correspondents who complain of the state of the turnip crop should put their shoulders to the wheel. If children were employed to pick off the under leaves of the turnips covered with aphides, to put them in baskets and burn them without delay, much good would result. Any fluid application for the destruction of the insects seems hopeless, as they invariably fix themselves on the under side of the leaves.—*I. O. W.*, in *Gardeners' Chronicle and Agricultural Gazette*.

### ON THREE-LEAVED BRANCHES, CONSIDERED IN RELATION TO THE THEORY OF THE ARRANGEMENT OF LEAVES IN PLANTS.

BY F. V. PAXTON, M.B.

IN the October number of SCIENCE-GOSSIP, Mr. Robert Holland alludes to a phenomenon which has attracted my attention during the past summer, on which I venture to offer the present communication, considering it to be not without interest, from its bearing on the theory of Phyllotaxis. This phenomenon is the occurrence of whorls of three leaves on opposite-leaved plants. I will take the liberty of calling branches or plants on which it occurs three-leaved, for the sake of shortness.

When examining the variations of the cotyledons of seedling sycamores, the question occurred to me: What would be the result, if a seedling with three second leaves should attain to maturity? Unfortunately, it was then too late to try the experiment during the present year. I was thus led to search for whorls of three leaves in other opposite-leaved plants. I was not long in finding that they are common in many plants. Thus, I have found them in the common nettle, hop, maple, *Clematis vitalba*, horse-chestnut, ash, privet, wood-sage (*Teucrium Scorodonia*), honey-suckle, cornel, and *Aucuba japonica*.

This list might doubtless be easily extended. The circumstances under which this variation occurs are very uniform, and are such as would enable us to predict the result which Mr. Aitken has actually observed in a seedling sycamore.

They are as follows:—1st. Where a whorl of three leaves is found in any axis of growth, the whole of that axis is almost invariably found to be three-leaved; 2nd. The three-leaved arrangement scarcely ever extends to secondary axes. The only plant in which I have yet observed it so extending is the Fuchsia, and in that not very commonly.

I may here mention a species of purple balsam, common in cottage gardens, which is invariably three-leaved in its primary, and opposite-leaved in all secondary ones. 3rd. Three-leaved shoots in herbaceous plants always grow direct from the root;

in shrubs and trees they are always vigorous spring shoots, very frequently growing from stumps or branches which have been cut back.

In order to ascertain, if possible, the nature of this variation, I have been led to examine more particularly the shoots of *Clematis vitalba*, a plant in which it occurs moderately often. This plant appeared most suitable for the purpose, from the very definite and uniform structure presented by its stems. On examining a young shoot, it is found to be fluted. In the more usual opposite-leaved form, there are seen to be six grooves dividing six projecting ribs. Each of these ribs corresponds to a large vascular bundle, and each groove to a much smaller one. One rib on each side extends from the point where the two expanded petioles meet, to the centre of a petiole in the next joint. The other ribs are intermediate in situation, and become continuous with, and send spiral vessels to, the expanded margins of the petioles next above them. Thus, the ribs of any internode correspond in situation with the grooves of the next.

In the three-leaved shoots there are nine ribs and nine grooves, their arrangement with reference to the leaves being similar in every respect to the ordinary form. The expanded edges of the petioles form an uninterrupted line round the shoot. Hence it would appear that, under certain circumstances, probably mainly connected with excess of nutriment, a bud is developed containing the elements necessary for the production of whorls of three leaves instead of two, this condition being, I presume, that designated a trifoliar phyton.

Considered with reference to the theory of Phyllotaxis, this variation would suggest some interesting considerations. This theory appears to be generally stated in treatises on botany, something as follows:—"The formative power of leaves moves in a spiral round the axis. This spiral is tolerably uniform in any one species, and is capable of being expressed mathematically. In order to extend this theory to plants with opposite and whorled leaves, it is usually assumed that in them one or more internodes are suppressed at each joint. To corroborate this view, the case is brought forward of those young vigorous shoots of ash and some other plants in which the leaves are not absolutely opposite, but one leaf of the pair is somewhat in advance of the other."

This explanation has always appeared to me somewhat forced. It is difficult to understand why, in a plant with whorls of seven or eight leaves, so many internodes should be suppressed, and then one be produced five or six inches in length. The examination of the three-leaved clematis shoot suggests a further question: Why should the suppression of two internodes instead of one, be regularly accompanied by an increase by one half of all the elements of the stem?



The force of this difficulty is increased by the consideration of a specimen I have lately found, in which there is undoubtedly a suppression of an internode; it is a strong vigorous shoot of the Clematis, having apparently four leaves in each whorl. Closer examination showed that this was not really the case; for, instead of the expanded petioles forming an uninterrupted line clasping the stem, as in the three-leaved form, the leaves were in pairs, one pair slightly in advance of the other, though so close together as to present quite a cruciate appearance. This arrangement continued for nearly the whole length of the shoot. In this form, the stem was six-grooved, and resembled in every respect the ordinary form.

These considerations suggest the following view of the structure of a stem, which, would, I think, give a fair explanation of the arrangement of leaves, both in alternate and whorled-leaved plants. A stem may be considered as consisting of a number of elements, capable of producing leaves, arranged round a central column. In plants with alternate leaves, the number of these elements equals the number of leaves in the complete spiral. In verticillate, including under this title opposite-leaved plants, it is double the number of leaves in each whorl. In the former case, the elements develop leaves singly, taking their turns in a regular order. Thus, in the very common arrangement which exists in the Cherry, &c., there are five such elements, which develop leaves in the order 1, 3, 5, 2, 4. In the latter case all the alternate elements develop leaves simultaneously at every other node. Thus, in a three-leaved branch there are six elements, of which 1, 3, and 5 develop leaves together, and 2, 4, and 6 at the next node. It may be objected to this view that the number of leaves in a whorl is often by no means uniform. Thus in the Great Bedstraw (*Galium Mollugo*) the leaves, though normally eight in a whorl, are often only seven, six, or even five. It would, however, appear not improbable that out of so large a number crowded together, and perhaps with a deficiency of nutriment, one or more elements might occasionally miss developing a leaf in their turn. I have lately found a specimen of an irregularity which may perhaps partially bear out this view; this is a shoot of clematis, three-leaved up to a certain point. Then occurred a node with two leaves simultaneous, but not opposite; about an inch higher was a single leaf, so placed as to complete the whorl; this arrangement, alternately of two leaves and a single one, continued up to the end of the shoot. On examining this stem, I found that it had but eight grooves instead of nine. In this case it would appear as if a slight defect in the structure of the stem had produced a delay, but not an entire suppression of a leaf.

As an instance of the diminution of the number of leaf-forming elements, I may mention a shoot of

cornel, in which the leaves, instead of being opposite, were alternate and tristichous. In this case we may suppose that, instead of the four leaf-producing elements natural to that plant, there are in this shoot but three; at any rate, in the tristichous form, three straight lines only can be drawn up the stem through the centres of petioles; while in the opposite-leaved form there are four, and in the three-leaved form six such lines.

In conclusion, we may observe that all these peculiarities are, as it were, personal to the particular axis in which they occur, and have little or no tendency to be propagated to secondary axes. They thus appear to point to some peculiarity in the original bud from which the axis is developed, and are such as might be most readily explained by the hypothesis of leaf-producing elements.

#### EGGS OF BUTTERFLIES AND MOTHS.

**I** WANT pretty and interesting objects for the microscope, for which 1-in. or 2-in. objective is sufficient. They should be such as any one can comprehend—in fact, common objects.” Such a requisition we have had, and perhaps some of our readers likewise, and soon found their wits exhausted in the endeavour to recommend something a little out of the ordinary track which should fully answer the requirements. Eggs to the rescue! Here seems to be beauty and variety appreciable by all, and by no means common in cabinets. A child can understand what is meant by the “egg of a moth,” or “eggs of the white cabbage butterfly,” and even a child would be surprised and delighted to see them under the microscope.

It seems rather inexplicable how it is that some very interesting and common objects do not meet with general appreciation,—Can it be simply because they are common? In this category feathers, or at least the “down,” might be mentioned. There is considerable variety in the feathers of different groups of birds. Then, again, the eggs of insects, what a very great variety of objects, with features so distinct that any one would recognise them, and yet so few microscopists include a good series in their cabinets. The small seeds of plants have been recommended and figured in this journal, and *Foraminifera* have had their share of attention, yet quite as much could be said in favour of eggs, and still eggs are almost forgotten. In order to awaken, if possible, a little interest in these organisms, we have selected a few for illustration, accompanied with brief notices. These all belong to the Lepidoptera; but the eggs of insects belonging to other orders are, many of them, scarcely less interesting.

The illustrations we furnish of the eggs of British butterflies are types of the principal groups. In the closely-allied species, many of the eggs are very



similar, and the figures we give are to be taken rather as indications of a somewhat neglected field of microscopical observation, than exhaustive of the subject. Of the *Pieridi*, the eggs of the Large Cabbage White (*Pieris brassicæ*) are characteristic (fig. 203). Their elongated form bears a remote re-

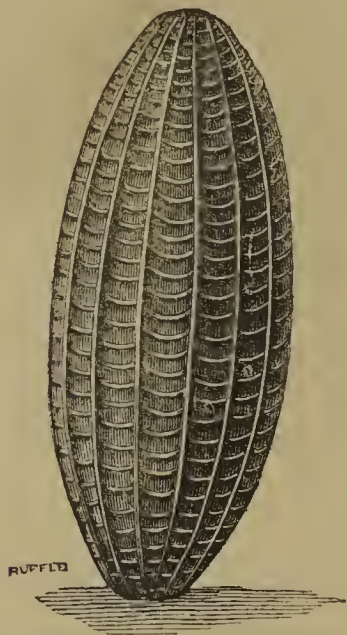


Fig. 203. *Pieris brassicæ*.

semblance to an Indian tom-tom in miniature; this may be exhibited in a woodcut, but not the iridescence or opalescence, which adds much to the beauty of these little-known objects. The insect, and consequently the eggs, are common enough everywhere.



Fig. 204. The Meadow Brown.

The eggs of the Meadow Brown (*Hipparchia Janira*) illustrate one genus of the *Satyridi*, and those of the Small Heath another. Those of the Meadow Brown (fig. 204) are much shorter and thicker than the foregoing, truncated at the apex, and channelled longitudinally with broad fluted furrows, crossed by transverse lines. They are quite distinct in the depressions and apex from the following.

Those of the Small Heath (*Cænonympha Pamphilus*) are truncated, with a papillate apex (fig. 205), the sides are fluted, but without the transverse line-like elevations of *Pieris*. In this form there is a very distinct departure from the type of the series illustrated by the Cabbage White.

The *Vanessidi*, which include the most showy of British butterflies, as the Peacock, Purple Emperor, Red Admiral, Camberwell Beauty, the Tortoise-

shells, &c., we illustrate by the eggs of the Red Admiral (*Vanessa Atalanta*). They are shorter than



Fig. 205. *Cænonympha Pamphilus*.

those of the Cabbage White, the ridges are more prominent and beaded (fig. 206), whilst the apex is flattened, and depressed in the centre.



Fig. 206. *Vanessa Atalanta*.

The Hair Streaks are represented by the Brown Hair Streak (*Thecla betulæ*), the eggs of which are somewhat spherical, with a flattened base, covered



Fig. 207. Brown Hair Streak.

with the projecting, and pointed walls of the small irregular areolæ. They are of a porcellanic whiteness, dull and opaque.

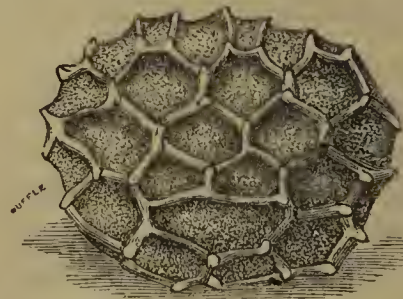


Fig. 208. The Small Copper.

The Coppers find their representative here in the Small Copper (*Chrysophanus Phlæas*); and a most singular and interesting egg it is. The figure is



something like that of a poppy-seed, with its prominent ridges and irregular hexagonal pits (fig. 208), but there is not the dull opacity of the seed, and as a type of insect eggs should have a place in every cabinet.

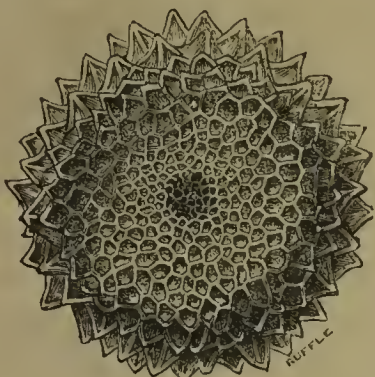


Fig. 209. *Polyommatus Corydon*.

The Blues again afford another showy type of egg, of which we figure that of *Polyommatus Corydon* (fig. 209). This egg is represented as seen from above, and the prominent angles with hexagonal pits present an elegant appearance, in fact the most elegant of any here figured. Those of some other Blues we have examined are very similar.

These must suffice for the Butterflies, to which we will add a selection from a long series of the eggs of moths, kindly furnished by Mr. Norman, of City Road, who has given special attention to the mounting of eggs of insects, as witness those of parasites in a previous number of this Journal.

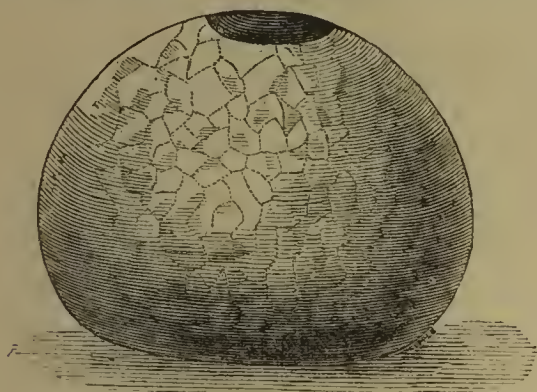


Fig. 210. The Buff Tip.

The Buff Tip (*Pygæra bucephala*) is a common insect. The eggs are flattened spheres, covered with a delicate minute tracery which scarcely deserves the name of markings. The base is quite flat and translucent, whilst the upper portion is of a dull opaline or porcellanic whiteness. The surface

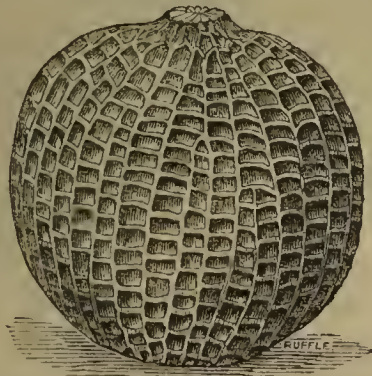


Fig. 211. The Cabbage Moth.

is probably glutinous at first, since small scales and hairs are usually adherent.

The Cabbage Moth (*Mamestra brassicæ*) is only too common. The eggs are nearly globose, with a papillate apex (fig. 211). The longitudinal and transverse ridges forming quadrilateral pits, which are more distinct than in the Cabbage butterfly.

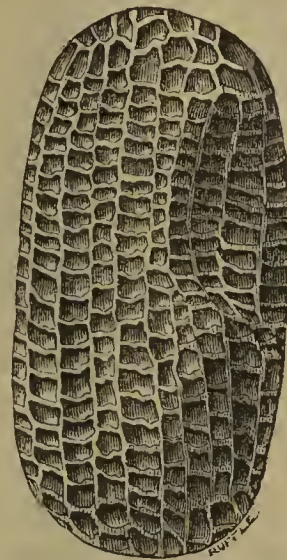


Fig. 212. The Willow Beauty.

The Willow Beauty (*Boarmia rhomboidaria*) has long cylindrical eggs with rounded ends, the surface traversed by longitudinal ribs connected by transverse ones which form irregular quadrilateral pits or areolæ.

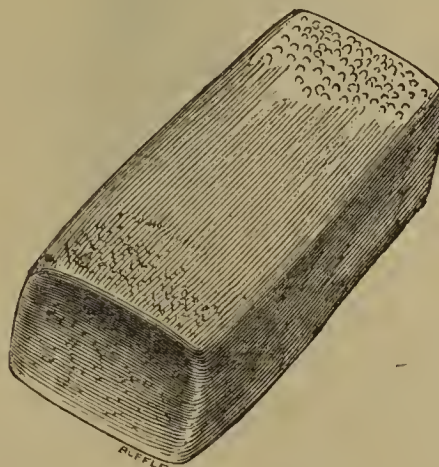


Fig. 213. The Canary Thorn.

The Canary Thorn (*Eunomos tiliaria*) has very peculiar eggs of an angular form, nearly square at the ends, with four parallel long rectangular sides. The texture is delicate, of a rather clouded transparency, faintly and minutely reticulated.

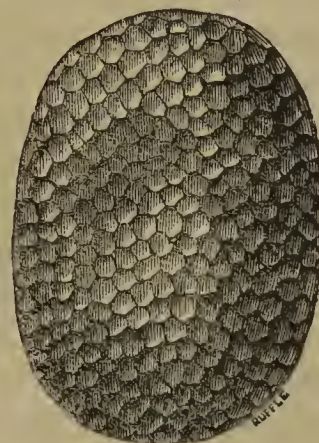


Fig. 214. The Common Magpie Moth.

The Common Magpie Moth (*Abraxas grossulariata*) has oblong eggs, which are hyaline and beau-



tifully iridescent, covered by a delicate hexagonal network. They are amongst the most transparent and delicate of eggs, and are exceedingly common in gardens.

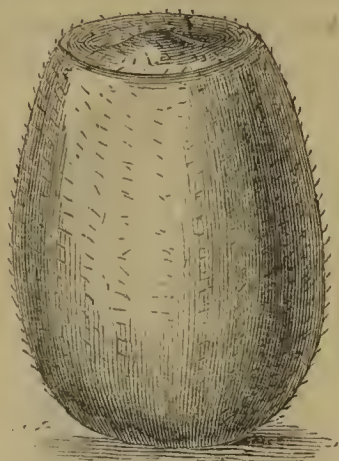


Fig. 215. The White Wave.

The White Wave (*Cabera pusaria*) has eggs similar in form and apex to those of the Small Heath, but with the surface clad with parallel rows of minute, rather rigid hairs. The texture is very delicate, and it is difficult to prevent collapsing in drying. The contents give a coppery iridescence.



Fig. 216. The Chimney-sweeper.

The Chimney-sweeper (*Odezia chærophyllata*) has eggs similar in form to those of the Magpie, but with a peculiar broad furrow on one side, running nearly the entire length of the egg, and rounded at the ends, so that it resembles a minute cowry shell. They have a peculiar dull, yellowish, horny appearance.

It would have been easy to have doubled the number of illustrations, but these will be sufficient to show how deserving of attention are these common little objects of our hedgerows and gardens.

UNITED BRANCHES.—In the neighbourhood of Bath I have observed several trees, principally oaks, having two separate branches united at some distance from the base; thus forming a loop. The branches unite so completely as to leave no visible evidence of the union. Is this a common occurrence, and what is the cause? I have not observed the peculiarity in any other than the above neighbourhood.—*L. Stammwitz.*

## ERRORS OF THE PRESS.

YOUR correspondent's (Major Holland) letter, published in the October number of *SCIENCE-GOSSIP*, relative to the mistakes which had been made in his interesting, clever paper, on the "Towing-Net," has recalled to mind many instances (some that had come under my own personal observation, others which had been related to me) of the most absurdly ludicrous errors made by these temper-trying little imps, "printers' devils."

Now, while I send these anecdotes to you with the idea that they may amuse some of your readers, I most decidedly hope that I shall not be suspected of want of sympathy with those unfortunate mortals who have suffered from such diabolical mistakes. *Au contraire*, I have been a victim so often, that I can quite enter into Miss Fanny Fudge's feelings, when she told her cousin, Miss Kitty, that,

"Though an angel should write, still 'tis devils must print;"

and I do believe there is something agreeably soothing to the human mind in the misfortunes of other folks, so I give "my experiences" in the hope of comforting.

A couple of years ago, a literary friend of mine, a lady who indulged in flights of fancy, was spending Christmas with me in Hampshire. The poetical mood was strong upon her one morning, and she dashed off a very affecting set of verses; they were highly moral, reflective lines, I may say quite in a religious style and tone; so, looking to the season and other matters, she entitled them

"FROM MEMORIES OF AN OLD YEAR,"

and sent them off to a local paper (not a Hampshire journal let me say). The day on which *The Dorset County Chronicle* was due, arrived; the paper came, the verses had the post of honour, every fine sentiment and serious thought was italicised and punctuated; but picture the dismay of the authoress on looking at the heading to read,

"FROLIC MEMORIES OF AN OLD GOAT."

Another time. A rather irascible vicar having fallen out with one of his parishioners, and wishing to administer him a good public rebuke, sent off a number of circulars to be printed. They began, "Whereas an evil-disposed person," &c. The bills were sent home late at night; and the vicar and his man went out, lantern and paste-brush in hand, to ornament all the shop doors and blank walls in the village. Next day, early in the morning, our clerical authority set off on his rounds. Jack Stubbington was on the broad grin. Jim Stiles nearly forgot to give his front lock of hair the right pull; he was laughing so when he looked at his reverence. Mrs. Hammond ran into her bakehouse, instead of staying, as was her wont, to be questioned about her sick husband. James,



the draper, fairly jumped over his counter, and was deeply engaged in diving into the contents of a mysterious bale on the floor, just as the vicar turned the corner.

"Ah! they have all seen my circular, and are enjoying the lecture I have thought it my duty to administer," condescendingly explained Dr. Blank to his clerk, the companion of his walk through the village. The man smiled delightedly; and, at the moment, who should come in sight but the miserable sinner, the object of the vicar's righteous wrath, Mr. Dash. He burst into a loud laugh.

"Perfectly outrageous; quite hardened," cried the vicar; but the rest of his reflections were lost to the public, for his eye fell on a large board carried by one of Dash's men, on which were *three* of his own printed effusions.

"Whereas an evil-disposed PARSON," &c., the change of one letter had made a wonderful difference in the circulars; they were no longer applicable to his neighbour, the cap fitted himself.

An Irish gentleman, who had been engaged in the national diversion, a row, wrote to the papers complaining of his antagonist, and asserted that the blows given him in the fray had caused a great contusion on his head; the P. D. printed it "confusion in his head," and, adding insult to injury, his foe wrote in reply that "he was right to a T."

*Beaumaris.*

HELEN E. WATNEY.

N.B.—How much of the sin lies with the illegible writing of correspondents we dare not calculate. Of course there are some honourable exceptions, but the poor P. D. should not have all the blame.

ED. S.-G.

#### "DO INSECTS FEEL PAIN?"

MR. J. R. S. CLIFFORD in last month's issue of the SCIENCE-GOSSIP has made what I consider both an unwise and unwarrantable attack on certain correspondents of the late "Naturalists' Note-book," upon the question "Do insects feel pain?" The attack is unwise, inasmuch as it will have a tendency to renew a long, well-sifted, and as regards results, a fruitless controversy; for unless the advocates of the negative side are prepared to accept reasonable, experimental, and inductive evidence, a lifetime of controversy will find us standing on the same footprint from which we first started. The attack is unwarrantable, because it is just possible that some of the correspondents of the "Naturalists' Note-book" may not see the SCIENCE-GOSSIP, and if they do not, they will have no opportunity of defending themselves and their opinions from Mr. Clifford's attack. Setting this aside, however, if it is the desire of the friends of SCIENCE-GOSSIP to take up arms and resume the scientific warfare, I am confident the

advocates of the affirmative side will not shrink from the engagement.

We will come now to consider the question before us, "Do insects feel pain?" But before offering any evidence to show that they do feel pain, I would like to make a few remarks on Mr. Clifford's paper.

In the first place, he says: "As it was remarked by a writer in this controversy, we have no means of forming an opinion at all, *except* by observing their movements under certain conditions;" plainly meaning in this expression that *by* "observing their movements under certain conditions," we *can* form an opinion, or rather, we have "the means" of forming an opinion whether they do or do not feel pain, and yet in the very next sentence he flatly contradicts his own words by asserting that "from merely seeing these movements *we cannot* ascertain what may be the sensations which cause them." In other words, that by merely "observing their movements under certain conditions," we *can not* form "an opinion as to whether insects experience pain." Such illogical argument as this will not materially advance the position of the negative side of the question. He afterwards goes on to say—"We find" (in insects) "no central brain, no concentration of nerve-matter, upon which, anatomists tell us, depend all the various sensations experienced by us, and the animals most resembling man. Insects have nerves scattered over their bodies, and united in knots or *ganglia*, yet from these no telegraphic indications are passed to, or received at, a central point, be it ever so small." By this I understand Mr. Clifford to mean, that no sensation of pain is experienced by the various *branches* of nerves, but only at the spot where those nerves are concentrated, viz., the *brain* and *spinal marrow*. Now, I ask Mr. Clifford whether he can point out any part of the human or animal frame, even where the nerves are finest, that is insensible to the touch of a sharp instrument. But even *supposing*—I say *supposing*, for I by no means grant you the position, but *supposing* that insects were not possessed of a *concentrated* system of nerves, of what use in the physiological economy would be those "scattered nerves and ganglia" which he grants are possessed by insects, if not to fulfil the same functions as they subserve in the higher animal organization?

But will Mr. Clifford prove that insects have not a *concentrated* nervous system?

The learned Professors Agassiz and Gould, in their work on "Comparative Physiology," p. 54, give the following:—"The nervous system of the articulata is arranged different from that of the vertebrata. The absence of an internal osseous skeleton in the former removes the nervous centres into new relations" (not as Mr. Clifford supposes, banishes them from the body of the insect altogether);



"and accordingly, we find it associated with the tegumentary and muscular systems, and ruled by the law which regulates their development. We still, however, distinguish cerebro-spinal and sympathetic nerves. The *brain* is situated, without exception, above the anterior extremity of the digestive tube, and connected by two lateral trunks with the spinal cord. Instead of being situated in the dorsal region of the body, as in the vertebrata, it is found, on the contrary, without exception, along the abdominal line. This difference in the disposition of the nervous system constitutes one of the essential characters distinguishing the two great primary subdivisions of the animal series. The number of the ganglia in the simpler forms of the articulata corresponds in general to the number of rings of the body; but in the higher groups there is often a fusion of two or more ganglia into one. This change is well exemplified in the development of *insects*, spiders, and crustaceans; the spinal cord of the articulata, like that of the vertebrata, is composed of motary and sensitive columns. In *insects* a special nervous system, the sympathetic, is distributed to the organs of vegetative life."



Fig. 217. Distribution of the cerebro-spinal system in a beetle  
—*Carabus nemoralis*.

Professor Carus, in his introduction to the "Comparative Anatomy of Animals," after giving a minute description of the various nerves and ganglia of insects, says: "In the same manner that the whole body in the perfect insect is more absolutely divided into segments, so also this inferior nervous mass is divided into separate portions; viz. into a chain of four ganglia; whilst, at the same time, the *cerebral ganglion* becomes more complete, and gives off several considerable nerves—large optic nerves in particular." He also says: "In most of them" (speaking of beetles), "the larvæ, as well as the perfect insects, possess a true *chain of ganglia*, the number of ganglia, however, being usually greatest in the larva; a remark which also applies to the larva of butterflies."

So much then to prove that insects not only have

a number of nerves and ganglia "scattered over their bodies;" but that they have a regular nervous system united to certain ganglia, which ganglia form a centre for the concentration of all nervous feeling; and which is, I have no doubt, productive of sensations of pain or pleasure according to the manner in which they are acted upon by external objects.

We come now to look at Mr. Clifford's experimental arguments. He says: "A [*daddy long-legs* shakes off a leg or two at a touch, and walks upon the window-pane thereafter with utter indifference." How does he know that he walks about "with utter indifference"?

He says, further, that "Wasps, with the abdomen entirely removed, will regale themselves upon some sweet compound with as much satisfaction as before." How does he know that it does it "with as much satisfaction as before"? Again, he says: "If you remove both wings from a fly, without otherwise hurting it, it seems in no wise annoyed, otherwise than by the hindrance to its powers of flight." I can only repeat the same question: how does he know that it is "in no wise annoyed" by the loss of its wings? It is very easy to make such assertions, but not so easy to prove them. If Mr. Clifford will take either a fly or a "daddy long-legs," and submit the root of its leg or wing to a high microscopic power, and then wrench off the limb, if he will then examine the ghastly wound he has made, observe the number of muscles and tendons he has torn asunder, and watch the quivering flesh he has exposed, I think he will be inclined to alter his mind, and come to the conclusion that insects, after all, must feel pain.

I am not prepared to say precisely to what extent they feel pain or pleasure; but, undoubtedly, they feel as much, in proportion to their life and the extent of their nervous systems, as man himself, and, in their proper sphere, enjoy themselves equally as much as we do ourselves. Who shall say that the insect myriads basking in the warm sunshine are not enjoying the pleasures of the hour as much as Mr. Clifford ever did? Or who shall say that the beetle we tread upon does not feel a pang equally as great in *proportion* as when a son of Anak yields up the ghost? Unless by some strange metamorphosis we could become transformed into Articulata, we can never come to a decided and definite knowledge of the actual amount of pain felt by each species of insect. What are the dictates of reason and common sense upon the question? Most certainly they tend to show that this class of organized beings are in every respect possessed of the requisite means for enjoying their existence and fulfilling the functions of nature, as well as the instruments by which their life may be marred by suffering and tortured by pain. The manner in which one class of insects



will wage war upon another, and even fight with members of their own community, is abundant proof that they have the power of inflicting pain upon each other; and the manner in which a weaker brother, sensible of the proximity of a dangerous neighbour, will fly or hide itself, as the case may be, from its more powerful enemy, shows that they are conscious of painful sensations. And how any one can rationally divide one class of God's creatures from the great unity of creation, and, because they appear small in our eyes, separate from them all sensations of feeling, either of pain or pleasure, I cannot imagine. True, indeed, it is that God careth for all His creatures, both small and great, and "provides them their meat in due season."

In conclusion, I would just say that although I am aware that Mr. Clifford in one place says he inclines to the opinion that insects possess a very little pain, yet the whole tenour of his paper goes to show that the amount of pain he assigns to them is so very infinitesimal that he might as well come out in his true colours and advocate the negative side of the question. I would also say further, that although I believe insects possess an amount of pain fully proportionate to their size and structure, yet I would not on this account refrain from killing them as far as is necessary for the advancement of scientific knowledge; or where their numbers make them a plague to man, as the *Aphodius sphacelatus* was, a few weeks ago, in our town; or, indeed, when they are destructive to our flowers, fruits, and vegetables. Neither do I think that killing them under those circumstances would be either cruelty or "murder."

Leicester.

W. NEWBERRY.

[As this question has been well discussed in other channels, we cannot insert any communications thereon after our next number.—ED. S.G.]

#### ITALIAN, ALP, OR LIGURIAN BEES.

I SEE that a number of your correspondents are bee-keepers, and as some of them have the Italian, Alp, or Ligurian Bee, I am sure it would be very interesting to most of your readers if they would be kind enough to give their opinion, and whether they really think that they possess any of the good properties ascribed to them, or if they are as good as the common black bee. It is said they fly further and faster, work earlier in the morning and later at night, carry heavier loads, work in wet weather, better fighters—they belong to the long-fingered tribe, can slip in and steal off their black neighbours' stores unmolested, quicker scent, prettier, besides a host of other virtues. No doubt they are certainly prettier than our black bees. They have two orange-red rings, about one-eighth of an inch in breadth,

round the upper part of their abdomen; the hair that covers their body is of a yellowish colour; but as far as my experience among them goes, I do not think they are the least better in any one respect; in fact, I would not like to say they were as good, till I try them another season. At page 188 of your August number, "G.C.G." gives us an account of his experiments in artificial swarming. I doubt that he will have seen before this time that his No. 1 hive is only a cross breed between the common bee and the Ligurian, the queen being a Ligurian, but fecundated by a black drone: there will be some among them that he will not know much difference of; and then, again, there will be some nearly black: some take most to the father's side, and again some take most to the mother's. I suppose them to have been standing near some black hives; if they were not, they would all dwindle away in a short time and leave the hive empty, as there would be no Ligurian drones out of the bar he got from his friend from the Woodbury hive, in time to fecundate the queen. Perhaps "G.C.G." will kindly let us know which of the two ways they went. I have not the least doubt but his other Ligurian queen would turn out all right, because no respectable apiarian would give away an Italian queen that he could not guarantee to be fecundated with an Italian drone. Those who keep Ligurian bees, and mean to keep them distinct, should remove them to a distance from black ones for a fortnight or so when they expect young queens out. I am often sorry to hear so many bee-keepers advocating small hives, in which the bees are confined for room, say, in the summer months, when the queen is in her full laying powers. In these small hives, the most of the combs being filled with honey and pollen, there is very little room for brood; consequently, for every egg that the queen lays in a cell, there are three at least eaten or carried out by the bees. The best sort of hive is made of good straw, with a flat wooden top, with from three to five holes for bell-glasses or boxes: the sizes I use are 16" x 12", 18" x 13", 20" x 14" inside measurement. I would strongly recommend your readers who use the small hives, whether for pleasure or profit,—for who does not like to see his bees doing well?—to try the above sizes. I invented a new cover for mine last season. It is made of sheet iron, well painted inside and out; keeps them very dry, prevents vermin from getting into them, also very neat; and another great advantage it has, it can be locked, to secure it from thieves. There has been a lot of plundering going on in this quarter this season. If any of your readers think of trying the above sizes of skeps, I will send them particulars, and I will also send them drawings, with full details of the cover, which any smith can make, at a cost of a few shillings.

JOHN McLURE.

Whitburn, Linlithgowshire.



## ZOOLOGY.

THE QUEEN OF SPAIN FRITILLARY.—Occurrences of this exceedingly scarce butterfly (once almost disputed as British) have been reported the last few years, and from a variety of localities; so that it is evident, in the most of them, there can be no collusion or deception. In the greater number of cases only solitary individuals are taken; now and then, within the range of a limited district, two or three have been taken; and in one or two instances only have several been taken in the same spot. This, like some other notable British instances of the occurrence of rare insects, opens up several very curious questions not easily solvable. Some of these captures of solitary specimens have been made upon ground where entomologists are accustomed to work, and we ask naturally in surprise in this and similar cases, "How strange it is that no more should occur!" A single butterfly taken, it is evident, must have had parents—it must have been one out of a number of other caterpillars at one period of its history; since female caterpillars deposit a number of eggs, rarely perhaps less than a hundred. Did a proportion of these also become butterflies? If so, how is it they were none of them seen? Or, if we suppose the decease of all but two or three out of the whole brood, it seems strange that this should happen repeatedly, and in very different localities. Besides, the occurrence of an insect at some date proves a long succession of ancestors extending back to an indefinite period; since we have no reason for believing that the work of creation is still going on; and the "advanced guard" of modern naturalists have not as yet demonstrated infallibly that one species can transmute itself or be transmuted into another. The particular economy of the "Queen of Spain," so far as known, renders the case of its excessive scarcity more inexplicable. The perfect insect, if not so feeble on the wing as its relatives *Euphrosyne* and *Selene*, is not one likely to take extensive flights; and all the species of the family are fond of mustering at some metropolis, being social in their habits. The caterpillar also, a feeder upon low plants, is not likely to wander far from its food, nor is there any reason why it should be more liable than others to die immature. Patient investigation may at length elucidate these abstruse chapters in insect life.—*J. R. S. Clifford.*

BRED SPECIMENS IN COLLECTIONS OF INSECTS.—The season is now approaching when entomologists, ceasing, in a great measure, from their out-door labours, betake themselves to the lighter, though not always more agreeable employ, of arranging the captures of the previous season. I feel tempted to repeat, in the largely-circulating SCIENCE-GOSSIP, a hint I threw out some years ago in a periodical of

limited range. It is this, that in all cases those specimens of *Lepidoptera* which have been bred in confinement from eggs received through correspondents, and the precise history of which is unknown, should be distinguished from individuals taken at large by the collector himself, or which are the progeny of others he has thus taken. There are some species, such as the scarce Chocolate Tip (*Clostera anachoreta*), nearly all the specimens of which in cabinets have been obtained by breedings, which is a matter of ease with these and most of the fat-bodied moths; but the history of the insects we place in our cabinets ought not to be a matter of indifference, and, though it is well to fill up vacant places with individuals we may not be able to identify with any locality, in default of other specimens, when we can ascertain the habitat of a species, we should be careful to register it. Owing to the neglect of noting down these, and the practice of some entomologists, who have placed eggs, larvæ, or imagoes of some of our butterflies and moths in certain localities with a view to establish colonies of them, a degree of confusion has arisen which appears likely to be increased. In every instance where he can, the collector should mark his captures, in order to isolate them from those bred specimens in his cabinet of more dubious history, which are of necessity allowed a place there.—*J. R. S. Clifford.*

THE FORCES OF THE UNIVERSE.—It has hitherto been the prevailing practice with experimenters to search for minute germs or material entities as the embodiments of vital organizations and the starting-points of life, as is illustrated by the foregoing experiments, instead of contemplating natural creation and Nature's operations, under wider and broader bases. Vitalized germs are no doubt the minutest stages in the existence of animal organisms; but it must be remembered that neither germs nor organisms developed from germs can exist independent of their external surroundings. The manifestations of animal and vegetable life are only visible to us when correlated with matter. Vegetation is correlative with air and earth; so are animals correlative with plants, and the human race with animals. We see that the atoms of one part of creation and the atoms of another part of creation do not exist independent of each other, but are interwoven one with another throughout the whole superstructure of creation, moulded and governed by forces which are universally applicable to all. That the physical forces of the universe fulfil an important part in the affairs of life is made manifest to us in its manifold forms throughout the animal and vegetable world. The decarbonization of the blood of living animals; the elimination of carbon from atmospheric air by the leaves of plants; the acidifying of food in the stomach, and the alkalizing of the same food in the duodenum for a destined purpose;



the conversion of starch into sugar; albumen into fibrine; the formation of lactic acid and phosphates in the urine, are the results of dynamic forces co-operating with matter. Heat and light are necessary elements of vitality; and it is our opinion that electrical force, in a variety of forms, fulfils a much more important part in the animal economy than has yet been explained. The contractility of muscular fibre, the reflex action of nervous power, sleep, the copulation of animals, post-mortem elevation of temperature, post-mortem rigidity, the twitchings of tetanus, the movements of vital fluids, and the primary movements of the primary molecules of the minutest organic cells, are no doubt brought about by electrical attraction and repulsion.—*Dr. Berwick's Forces of the Universe.*

SMALL EGG.—I have another black Spanish hen's egg, the dimensions of which are—circumference round the two ends  $4\frac{3}{8}$  inches, round middle 4 inches, length  $1\frac{3}{8}$  inch.—*J. R.*

ASSIMINEA GRAYANA.—This shell is equally abundant on both sides of the Thames wall here; the only difference is, however, that those inhabiting the mud and grass outside it appear never to come to more than half the size of those found in the brackish ditch a few yards off, which seems to be a much more favourable locality for the development of the species, being full of sword-grass, &c.—*Harry C. Leslie, Erith.*

SINGULAR EMERGENCE OF FLEAS.—A friend, on whose truthfulness I can depend, relates the following incident, which occurred in his boyhood, but made an ineffaceable impression on his mind. In the house where he was living at the time it happened, there was a cat to which he was greatly attached; from some disease the animal died when only a few years old (about three, as he thinks), and boy-like he resolved that his pet should be buried in an uncommon way. Accordingly he obtained some mortar and bricks, and in a secluded place in the garden constructed a sort of tomb, in which he placed it, and walled it closely in. Almost immediately after he was sent away, and did not return again for five or six weeks. He had not been back long when he remembered his exploit in the way of burial, and resolved to disinter his favourite to have a look at it, and see what change had occurred. Taking a suitable instrument, he knocked off the upper layer, and was about to peep in, when suddenly out there issued a multitude of fleas! He could only compare it to the effect produced when a bee-hive is knocked over, and out issue the myriads of those busy creatures to avenge the affront. For some hours he was in a terrible state, not only from the bites he received, but from the sickening sensation it produced upon him; he was compelled to frame an excuse to remove his clothes,

and did not get over the shock for some while. The time was July or August, favourable to the increase of insect life, yet it seems odd that after the death of the animal fleas should have continued to live upon the carcase; in fact, they must have been generated, and passed through the earlier larval stage, since there were no signs of such a host at the time the cat was interred. Owing to the hasty retreat he made, he did not ascertain the state in which the body was, nor did he ever again return to the spot.—*J. R. S. Clifford.*

FLOCK OF MISSEL-THRUSHES.—About a hundred of these birds were seen in the suburbs of Leicester on the 4th of September. Is it not unusually early? There were too many for a mere "family gathering."—*T. T. Mott.*

ORDNANCE AND FISH.—In the last number of SCIENCE-GOSSIP, p. 213, is a note on the indifference of fish to the firing of heavy ordnance, contrary to the prevalent opinion. I confess to considerable doubt as to fish being any way affected by mere sound, notwithstanding the stories so common in guidebooks, &c., of their assembling in ponds to be fed at the ringing of a bell. An incident very similar to that quoted by Mr. Budge happened to myself many years ago. I sent a note of it at the time to the *Zoologist*, and now transcribe it from the volume for 1845, p. 1194. "I was fishing during a rowing match; it was a sunny day, and there was a shoal of bleak near the surface of the water, and though some small cannon on an island about four hundred yards from the spot were repeatedly discharged at intervals, they took not the slightest notice, and I caught one in the midst of the firing."—*G. Guyon, Ventnor, Isle of Wight.*

LOCUSTS IN ALGERIA.—There are still traces of the great grasshopper plague of last year (1867), and a fearful scourge it must have been. They came in flights which appeared as a cloud on the horizon no bigger than a man's hand, and advanced like the wind in such terrible force that the very birds fled dismayed, and the whole heavens were obscured. They remained in the neighbourhood over three months, devouring everything around them, beginning with the delicate shoots that they liked, and ending with the tough palm-branches which they did not like. They disregarded all the noise and tom-tom music that was got up to frighten them and were killed in millions by the natives who came out to fight them. My friend, the Director of the Jardin d'Acclimation, took to laying down heaps of grass at intervals, into which the beasts crept in swarms, and when safely in were burnt in a series of funeral piles. Ravenous and ruinously destructive as they are, they are never known to bite a man, being purely graminivorous in their nature.—*Hon. L. Wingfield, Under the Palms.*



## BOTANY.

CLIMATE PRODUCTS OF CALIFORNIA.—This is a bad year to form any opinion of the products and beauty of this country, owing to the small rainfall during the past winter, or rather rainy season. There has been more drought so far this year than in any preceding one for the last forty years, so some of the old settlers tell me. A dry year occurs, as a rule, about every seven years; but I believe, as the country becomes settled up, and the landholders see the benefit of tree-planting for timber, there will be a marked increase in the rainfall. Most of the plains in the southern counties are now destitute of trees, and what few valleys are timbered are rapidly being cleared for firewood; and no one at present plants any trees but what will in a short time bring him in a good return—say, fruit-trees, comprising Orange, Lemon, Citron, Lime, Fig, Olive, Almond, Peach, Nectarine, Plum, Apricot, Pear, Walnut, and Vine (the Apple does not do very well here); hedge-trees, Willow and Osage Orange; side-walk trees, Locust (not the Honey-Locust), Pepper, and some few Poplars. The climate is everything that can be desired, neither too hot in summer nor too cold in winter. There has never yet been a case of sunstroke or hydrophobia in the whole of California. The rose blooms all the year round; and, since I came here, the Geraniums (zonale), Verbenas, and Petunias have been a perfect blaze of colour. I many times wonder how some of the new varieties of the above would look if grown here; the older varieties of roses are larger and finer than any of the same varieties I have seen at the rose shows in England. This would be a good place for the hybridist, everything growing to such perfection, and no rough or cold weather to contend with. There are some enormous vegetables grown here, beets over a hundred pounds in weight, and melons after the giant gourd style. The Castor-oil plant is a tree in some cases thirty feet high, and trunk eighteen inches in diameter at base, beautiful with nearly every shade of leaf-colouring, and with gorgeous spikes of bloom. The Date-palm seems to me quite as tall and healthy as in Jamaica: there are, I believe, only three specimens in this valley, and three at the San Gabriel Mission, ten miles distant. There is also a variety of Fan-palm in several gardens, which grows very luxuriantly. I believe the Banana will grow here: several friends of mine are about trying it, as the fruit brings a good price. The grapes are not yet in the market, but the vines are promising well. The price of the wine grapes here (Mission variety chiefly) is half a cent per pound, and money is very different in value to what it is in England; a dollar, 4s. 2d., in most ways, only goes about as far as 1s. in England, and the smallest coin in circulation is a

dime, or ten cents: in San Francisco five-cent pieces are partially used, but are looked upon something like the farthing in England. — *The Gardener's Magazine*.

FINGERS AND TOES.—The malformation among the turnips, locally known as "Fingers and Toes," is said to be very prevalent this year in the west, and the subject of much talk in rural districts: in considering this unsightly distortion of the root, whereby it is multiplied into a knotted and deformed tassel of crooked fibres and digital disfigurement, may not the question be suggestively asked if this perversion of sap directing its growing efforts beneath the surface of the ground instead of above it, be due to a lapse of nourishment, by the want of rain, when the poor turnip, impoverished by hard fare, with its meagre top and dwindled bulb, revenges its deprivation of moisture by reversing the order of nature?—*B., Fowey*.

FOXGLOVE (p. 91).—The following extract from Coles's "Adam in Eden" is interesting when taken in connexion with Mr. Britten's (*l.c.*): "Fuschius makes as if he were the first that called it *Digitalis*, being induced thereunto by the hollow form of the flowers, which are like finger-stalls. . . . It hath no other name in English that I know but Foxgloves, unlesse some call it Foxfinger" (p. 126, edition 1657). There is but one copy, I think, in the British Museum, and that wants pp. 152—157, 396—551! —*R.T., M.A.*

HERBS.—It may interest some readers to have a few more choice extracts from Cockeram's Dictionary (p. 235), under the above heading. "There are nineteen so called herbs, of which the following are the most noteworthy. *Achimedis*, an herb which being cast into an army in time of battle, causeth the soldiers to be in fear; *Anacramseros*, an herb, the touch whereof causeth love to grow betwixt man and man; *Hippice*, an herb, borne in one's mouth, keeps one from hunger and thirst; *Ophyasta*, an herb dangerous to look on, and being drunk, it doth terrifie the inside with a sight of dreadful serpents, that condemned persons for fear thereof do kill themselves; *Gelotaphilois*, an herb drunk with wine and myrrh, causeth much laughter." With this last I close the strange collection, adding only that this Dictionary is "an interpreter of hard English words, enabling, as well ladies and gentlewomen, young scholars, clerks, merchants, as also strangers of any nation, to the understanding of the more difficult authors already printed in our language, and the more speedy attaining of an elegant perfection of the *English* tongue, both in reading, speaking, and writing." It would be interesting to know upon what foundation this (in our view) nonsense rests.—*R.T., M.A.*



## NOTES AND QUERIES.

FLORA HANTONIENSIS (pp. 166, 212).—I am now able to answer my query on p. 166. Looking recently over my copy of the "Flora Vectensis," I found a note on p. 132 which I had formerly written, referring to the *Phytologist*, vol. iii. p. 428, in which the matter is cleared up by Dr. Bromfield. Throughout the "Flora Vectensis" the Catalogue is quoted under the heading Pulteney, and it is in a note (*Phyt.*, l. c.) that the Doctor states the real authors to have been Dean Garnier and the Rev. W. Poulter (on the information of the Dean himself). He also remarks that the similarity of the names, Poulter and Pulteney, most likely occasioned the latter to be considered the compiler of the Catalogue by the authors of the "Botanist's Guide." On p. 205 (*Phyt.*, vol. iii.) Bromfield says he has taken the stations "from the original and now very scarce volumes." Localities are indicated in the Catalogue for thirty-two Isle of Wight plants. [I may here remark that this mistake on the part of the authors of the "Botanist's Guide," occasions a slight confusion in their records of Hants plants. For instance, *Asparagus officinalis*, Freshwater, I. W. (Guide, p. 316; *Phyt.*, iii. p. 960); *Alisma ranunculoides* (Guide, p. 316; *Phyt.*, p. 1003); *Myriophyllum verticillatum* (Guide, p. 322; *Phyt.*, p. 368), both at Sopley, and *Taxus baccata* (Guide, p. 322) do not occur in the "Hampshire Repository" list, and are probably due to Pulteney, as the "Catalogue of Plants of Dorset" is cited as authority for *A. ranunculoides*.] I do not think the list was ever continued. I have replied privately to Mr. Reeks's very kind offer (p. 212), and hear from him that lists of plants for different parts of Hampshire are in existence. It is to be hoped that now a botanical section has been formed in connection with the Hants and Winchester Scientific and Literary Society (*Journal of Botany*, May, 1870, p. 166), a "Flora Hantoniensis" may soon make its appearance. (Mr. F. J. Warner, 3, Clifton Terrace, Winchester, is the Hon. Sec. to the section above referred to.)—*R. T., M.A.*

HELIx CARTUSIANA.—At p. 70 of your interesting periodical for March 1st, 1868, "H. C. L." gives the "sand dunes north of Deal" as a locality where *Helix Cartusiana* (Gibbs's snail) is found "plentifully." There must be some mistake here. It is certainly *not* to be found there at present. I have just returned from a long search for it; and Mr. Harding, a well-known naturalist and collector at Deal, told me that he has known the dunes for five-and-twenty years, and has never found it there. I found *H. virgata*, *ericetorum*, and *rufescens*; the latter, in the young and white state, not unlike "Gibbs's snail;" but the true shell is certainly not to be found there now, nor do I know a locality for it.—*Alexander Halley, M.D., F.G.S.*

SIREX JUVENCUS.—Is this a common insect? My reasons for asking this question are twofold; first, having taken two fine females of this species from the trunks of firs near Chatham, on the 30th September, and one while it was very busily examining an oak post, on the 2nd October; and wishing to obtain some information concerning them, I had recourse to my stock of entomological and natural history lore, besides others to which I have access, but was thoroughly unsuccessful, although its near relative, *S. gigas*, was well represented both pictorially and descriptively. The

second reason is, that although I have entomologically examined the trunks of these fir-trees for years past, and many others in the adjoining wood, I have never before seen the insect alive, and was therefore quite surprised when I came unexpectedly upon it.—*W. Chaney.*

HARVEST-BUMPS.—In reply to query by W. B., Fowey, in last month's SCIENCE-GOSSIP, harvest-bumps are caused by an insect much resembling the itch insect. It is described in "Carpenter on the Microscope" (1856 edition, pp. 6, 83) as *Acarus autumnalis*. I can certify to this being correct, as a friend of mine sent me several extracted by a surgeon last year (from the irritating eruption described), two of which I have mounted in balsam.—*G. M. Iliff.*

FUSUS CONTRARIUS.—H. C. Leslie would be glad to know if any correspondent of SCIENCE-GOSSIP could tell him where he can collect *Fusus contrarius* (characteristic fossil of the red crag), and whether it is to be had in the south of Essex.

TRAVELLER'S DELIGHT (p. 237).—The British species of Clematis (*C. vitalba*) certainly would not be the plant referred to in Wraxall's "Backwoodsman;" but the North American species (*Clematis viorna*) is also known as "Traveller's Joy," and might thus be the plant intended. See Paxton's "Botanical Dictionary."—*G. H. H.*

GOLDFINCHES.—A country bird-dealer informs me that there are two sorts of goldfinches; one that builds in plum-trees, has black legs, and is no use as a songster; and one nesting in apple-trees, having white legs and a good song. Can you, or any of your readers, say if this is so? The man was in earnest, but none of my books allude to more than one kind.—*J. R. Davies.*

WAFFEL (*dice*, German), often pronounced Yaffel. May not the woodpecker get this name from the square dice-like marks on its feathers?—*Isabella C. Grant, Burghfield.*

AQUARIUM.—Can any of your readers inform me if india-rubber tubing can be safely used in drawing off salt water from an aquarium? I have hitherto avoided it, and used only glass, but the india-rubber would be often more convenient, if equally safe.—*A. B.*

NATURAL HISTORY SPECIMENS AND THE "SAMPLE POST."—For some time past we have been in the enjoyment of a great public boon, by which specimens of natural history—under a certain weight—have been transmitted through the "sample post;" but with the 1st of October came a sweeping and unlooked-for alteration, destroying all the former facilities of a *cheap* transmission. True, the authorities have given us the halfpenny postage with one hand, but with the other have taken away as great or a greater privilege, by depriving us of the benefit of the "sample post." It may be argued, that specimens of natural history are in themselves nothing more or less than *samples*; but the Secretary of the General Post-office says: "Specimens of natural history *cannot* be considered either as *bonâ fide* trade patterns or samples of merchandise." Consequently, we must abide by the decision of the powers that be. We cannot, however, be blind to the fact that such a course is in a measure detrimental to the study and



advancement of natural science. As a general rule, naturalists are not immensely rich people, and the vast difference of sample post and letter rate cannot but be felt by all of us in a greater or less degree; in fact, the transfer of specimens will be greatly retarded, and most assuredly, the Post-office will not be a gainer by the alteration. It is simply absurd to talk or think of sending such small parcels as weigh only a few ounces a long distance by railway, as the cost—not to mention the inconvenience of obtaining them in remote localities—would be utterly incompatible with the sometimes worthlessness of the objects sent. The "sample post" has hitherto supplied, to a certain extent, this great desideratum; and the privilege was alike known and appreciated more by the working "millions" than by the "upper ten thousand," and I cannot imagine that the revenue was a loser by conferring such a public benefit. I believe I am expressing the sentiments of a very great number of persons in what I have said; and it seems to me that if the matter in its true and unpolished light was laid before the Postmaster-general, he would be led to reconsider his decision with regard to the new regulations of the "sample post."—*G. B. C., Ringwood.*

DRAGON-FLIES.—It may perhaps interest your correspondent J. D. Groves to know that I also saw a large black-spotted dragon-fly in town about the 31st of August, opposite the General Post-office, at noon-day; and a few days before one was captured in Threadneedle-street, E.C., by some boys—it was described to me as being a *very large* brown one. With regard to their being at so great a distance from water, I may mention that they are frequently met with in such situations during the latter part of August and September.—*S. A. Harry.*

THE BRAIN OF INSECTS.—"That somewhere in the head of an insect resides a power of volition, whereby the movements of the body are directed, under ordinary circumstances, is more than probable," says Mr. Clifford, in the last number of SCIENCE-GOSSIP. In my opinion, the existence of this centre of volition in an insect's head is very improbable; and it seems much more likely that the system of ganglia takes the place of a central brain. I will give one of the reasons why I hold this opinion: I have seen a common house-fly, whose head I had cut off by accident, when placed on its legs, rub its two fore-legs together, as we often see flies do on the window. This must have required the action of the will; but a centre of volition in the severed head could not have exerted any influence on the body, therefore, the source of volition must have existed in the body itself.—*A. J. M. A.*

SCENE IN THE NEW FOREST, HAMPSHIRE.—"When they were tired of the sea there was the great moor and the forest to fly to. The time to see the old moor in its greatest beauty was about the middle of May, when for a little time the flowers of early and later spring meet, as it were, to hold a festival. The sun would then shine out warm and bright, and the wind came blowing across acres of golden gorse, sweetened with its perfume, and mixed, too, with the breath of the hawthorn. All round, the gorse there twinkles for miles; and by its side, as if striving to overtop it, grows the little 'petty-whin,' with its yellow blossoms; and the great holly and 'holm' bushes stand out ever green, budding with their clusters of little white waxen flowers; whilst the knee-holm, as the butcher's broom is there called, grows by their side, headed

with crimson berries; and the 'black-heart' is flowering with its pink bells, and the fern is shooting up its long crosier-headed stems. Great belts of firs enclosed the oak woods, which then were budding into the tenderest green, breaking into shades of delicate amber and gold, in strange contrast to the deep dark green of the firs; and the 'rainers,' as the bark-peelers were called, were then busy, and here and there the felled oaks lay on the ground with their great naked white bones. 'Ech, faith, and my pretty leddy has a very pretty hand, and it be's as sweet as the 'touchen-leaves' in the forest.'"

LOCAL NAMES OF PLANTS.—As much has been written lately in SCIENCE-GOSSIP as to common names of plants, I send you the above extracts from "The Cousins," a tale by Mr. J. Wise, author of a "History of the New Forest," with which he was well acquainted; the "Black-heart," mentioned above is perhaps the Bilberry (*Vaccinium Myrtillus*) but the "touchen-leaves" I know not, though probably some Hampshire man may know their touch, and the plant intended.—*Edwin Lees, Green Hill Summit, Worcester.*

LEPORIDS.—Whether hybrids can be obtained between the rabbit and the hare has long been a disputed question: the following communication made last year by M. Eugène Guyot to the French Académie des Sciences Naturelles, ought to set the matter at rest. "The production and reproduction of the leporid, as this hybrid has been named, have been long contested, or, it should rather be said, have been energetically denied. Nevertheless, they are facts which must for the future occupy a place in the annals of natural history, as several of these animals have been born under my own eyes; and I possess at this moment genuine specimens. The production of these hybrids is, it must be confessed, rather a haphazard affair, as the hare and the rabbit are by no means willing to pair. Still I am in a position to affirm that it is far from an impossibility, as proved by my own experiments conducted so lately as November, 1868. Of former results I say nothing; they were not carried out under my own observation, and they have been contested. Now, however, I can speak of circumstances of the exactness of which not a doubt can be entertained. The animals are in my own possession, they were born in my hutches, and from every point of view they carry with them the undeniable seal of their origin. In a word I possess two adult leporids, the offspring of two female rabbits and the same male hare. Seven in all were born." Can English rabbit-keepers verify this statement? I know of the existence of the so called hare-rabbit. I have often had them in my possession, and splendid fellows they are, with a very "hybrid" look, but I could never trace their origin satisfactorily.—*W. W. Spicer, Havre.*

ISTHMUS OF PANAMA.—"What a paradise of the senses is this beautiful land! The constant rain and the intense heat of the sun produce a vegetation more lovely and luxuriant than is to be seen anywhere else in the world. Gigantic trees, mahogany, bamboos, palms of every variety, bananas, tree-ferns, magnolias, tall grasses, and innumerable flowering trees and shrubs, compose the forest, and fringe the banks of the rivers; while from the surface of the swamps spring white, yellow, and blue lilies of every size and description. Amid all this glorious foliage, dart birds of brilliant plumage, and



insects whose glittering wings rival the hues of the rainbow."—*Townshend, "Ten Thousand Miles of Travel."*

**PRAIRIE FIRES.**—"Towards evening we were gratified by seeing, for the first time, that splendid spectacle, a prairie on fire. The grass, parched with the burning sun, is purposely fired by the natives to promote the growth of the new crop, which last, owing to the heavy dews, starts long before the rainy season sets in. The conflagration extended for more than three miles, the strong evening breeze driving it onwards in curling fiery billows. Volumes of smoke, loaded with burning particles of grass, ascended in clouds, increasing the grandeur and beauty of the scene by their various tints of red, pink, and purple diffused throughout the atmosphere."—*Don Ramon Paez, "Life in the Llanos of Venezuela."*

**WHITE ANTS.**—The Cupim nests or termitaria are lumpy pillars and pyramids of clay, yellow or drab-coloured, as may be the subsoil, and sometimes five or six feet high. They are scattered like tombstones, occasionally in pairs or trios. Nowhere, however, in the Brazils, do they constitute so conspicuous a feature or cumber the land as in the Somali country. Opened, the mounds suggest a mammoth hotel, as Asmodeus would see it, and a few stiff blows with a pick upon the hard crust of those which seem to be in ruins bring from their burrows a frantic swarm, as the said hotel would show at the cry of fire.—*Burton, Highlands of the Brazil.*

**SWARM OF BEETLES.**—It is somewhat remarkable that a swarm of beetles resembling that mentioned by your Leicester correspondent, visited this neighbourhood, Beaumaris, on and after the 10th of September last. They did not become such a plague as those described in his letter, for their numbers were not so great, but, when walking or driving, the annoyance was considerable. They were also observed at Llandudno, a fortnight later, by the writer. A naturalist, to whom one was sent, named the creature *Aphodius contaminatus*, and suggested that the presence of large numbers of these unattractive visitors ought to offer serious considerations to those who have sanitary arrangements under control.—*E. E. S., Beaumaris.*

**THE BROWN TAIL MOTH (*Porthesia auriflua*).**—They begin by forming with their own hair a soft bed upon the surface of a branch or leaf, upon which they deposit several layers of eggs, which they then surround with a fresh layer of fur. When all are laid, they cover them also with fur, the filaments of which, however, are differently disposed. The hairs which form the inside of the nest are arranged without much order; but, on the contrary, those which form its external covering are artfully arranged, like the slates of a house, in such a manner that the rain which falls on them must glide off. The females, which thus provide for the protection of their young, have the extremity of their bodies furnished with a great quantity of fur, destined for this use. Degeer observed a proceeding similar to that described above with certain species of aphides, which cover their eggs with a cotton-like down, stripped from their own bodies by means of their hind feet; but in this case the eggs were not enclosed in a common bed, but each in a separate covering.—*Lardner, Museum of Science and Art, vol. viii.*

**SWIFTS IN SEPTEMBER.**—On my return from a walk, between 5 and 6 o'clock, on the 15th of September, I was surprised at hearing the cry of the Swift (*Cypselus apus*), and on calling the attention of a friend to the circumstance, we counted eight of those birds hawking above and around the old castle. The only reason I could account for their appearance so late in the year was, by the supposition that they were the offspring of a second brood, and had not previously felt themselves strong enough to undertake their long migratory journey. The Rev. G. White mentions a similar occurrence, but, I think, at an earlier date.—*E. A., Norwich.*

**CRITHMUM MARITIMUM (ISLE OF WIGHT).**—Under the title *Sampire* is given, in Coles's "Adam in Eden," p. 378, the following, which I copy just as it stands in the 1657 edition: "So great plenty" (in the I. of W) "that it is gathered (yet not without danger), for some have ventured so far upon the craggy precipices that they have fallen down and broken their nets, so that it might be said they *paid*. For their *Sawce*; and afterwards being pickled up, is sent to London and other places." The same author gives Miltwast as a synonyme for the "scale-ferne," or Ceteract. What is the meaning of the term?—*R. T., M. A.*

**INSECTS ON SNOW.**—In Canada I have found, in the depth of winter, living and active insects on the surface of the snow, which are seen nowhere else and at no other season. Little hopping atoms of singular structure, adapted to a mode of progression peculiarly their own, dance about on the unsullied bosom of the new-fallen snow. They belong to the genus *Podura*, and are distinguished by having at the extremity of their body two long stiff bristles, ordinarily bent up under the belly, but which, at the pleasure of the insect, fly out straight with great force, and thus jerk it into the air, on the principle of a child's toy frog.—*P. H. Gosse, Romance of Natural History.*

**FACTS FOR SPECULATORS.**—Here is a curious fact for those who speculate on the possible origin of species. We take it second-hand from the "Popular Science Review": "The Mole is blind. Not so the foetal mole . . . which at the time of birth is endowed with organs of vision of considerable perfection, while in mature age it is deprived of the means of sight, in consequence of certain changes which take place in the base of the skull, terminating in the destruction of the most important structures on which the enjoyment of the sense of sight depends." Coupling this with the statements of the German anatomist alluded to by Prof. Rolleston (p. 1377), that in the embryonic condition the ascidian polyps have an axis skeleton corresponding to that of the vertebrate animals, we have facts more startling even than the hypothetical case of the bear and the whale.

**DEATH TO ANTS.**—Get a honeycomb sponge, the larger the holes in it the better, and cut up into pieces the size of a large apple; dip these pieces into a mixture of treacle and water, and lay them about where the enemy most abounds; in a short time the cavities will be full of ants. Pick them up quickly, and have a can of boiling water at hand; throw the sponge into it, and the result can be readily imagined. Continue this for a time, and the enemies will be greatly reduced, if not entirely eradicated.—*"C.," in Gardener's Chronicle.*



## NOTICES TO CORRESPONDENTS.

ALL communications relative to advertisements, post-office orders, and orders for the supply of this Journal, should be addressed to the PUBLISHER. All contributions, books, and pamphlets for the EDITOR should be sent to 192, Piccadilly, London, W. To avoid disappointment, contributions should not be received later than the 15th of each month. *No notice whatever can be taken of communications which do not contain the name and address of the writer, not necessarily for publication, if desired to be withheld.* We do not undertake to answer any queries not specially connected with Natural History, in accordance with our acceptance of that term; nor can we answer queries which might be solved by the correspondent by an appeal to any elementary book on the subject. We are always prepared to accept queries of a critical nature, and to publish the replies, provided *some* of our readers, besides the querist, are likely to be interested in them. We do not undertake to return rejected manuscripts unless sufficient stamps are enclosed to cover the return postage. Neither can we promise to refer to or return any manuscript after one month from the date of its receipt. All microscopical drawings intended for publication should have annexed thereto the powers employed, or the extent of enlargement, indicated in diameters (thus:  $\times 320$  diameters). Communications intended for publication should be written on one side of the paper only, and all scientific names, and names of places and individuals, should be as legible as possible. Wherever scientific names or technicalities are employed, it is hoped that the common names will accompany them. Lists or tables are inadmissible under any circumstances. Those of the popular names of British plants and animals are retained and registered for publication when sufficiently complete for that purpose, in whatever form may then be decided upon. ADDRESS, No. 192, PICCADILLY, LONDON, W.

Mrs. S. and J. Hill.—It is *Polyporus lucidus*.—F.

V. L.—We decline to insert "exchanges" unless the generic names are written in full.

H. P.—We have plenty of all the specimens you name. As to *Trichia*, see paper by F. Currey in *Microscopical Journal*, vol. iii., 1st series.

W. B. H.—In an early volume of SCIENCE-GOSSIP there is some information on bed bugs. See also, Douglas & Scott's "Hemiptera heteroptera."

H. R.—Thanks. Forwarded to J. Britten, Esq., F.L.S., the Herbarium, Kew.

C. D. Harley.—Do not be deceived, as some have been. They are worthless.

A. P.—Not uncommon further south, at any rate.

W. G.—We think that you can procure labels for the herbarium, formerly supplied by Mr. Pamplin, of Dulau & Co., Soho Square.

S. L.—*Ambrosia trifida*, L., a North American species.—B.

R. R. W.—*Poa trivialis*, L.—B.

H. G.—*Galinsoga parviflora*, Cav., a Peruvian annual, completely naturalized for many years about Kew, Mortlake, and Richmond.—B.

R. M.—*Cerastium latifolium*, L.—B.

E. C. B.—The sandwort from New Hampshire is *Arenaria Grænlandica*, Spr.—B.

T. H.—The fern is *Lastræa oreopteris*.—B.

J. E. F.—The caterpillars are those of a moth, *Agrotis segetum*.—F. M.

R. E.—The maggots are those of a dipterous fly.—F. M.

C. J. S.—Letter received, but not "proceedings."

J. S. and J. H.—See remarks on "Smother Flies" in this number.

R. E.—We have seen no specimen of the fly.

## EXCHANGES.

NOTICE.—Only one "Exchange" can be inserted at a time by the same individual. The maximum length (except for correspondents not residing in Great Britain) is *three* lines. Only objects of Natural History permitted. Notices must be legibly written, *in full*, as intended to be inserted.

TWENTY-FOUR varieties of Micro seeds offered for a few seeds (unmounted) of *Silene alpestris*, *Maurandya Barclayana*, or *Eschscholtzia tenuifolia*.—Isaac Wheatley, Malling Street, Lewes.

CONCHOLOGY.—*Oliva reticulata*, *Cypræa ovallata*, and *Nerita meleagris*, offered for fossils from Silurian Limestone. (To be sent by sample post.)—Address A. J. M. A., 37, Irvine Street, Liverpool.

LICHENS.—*Verrucaria polysticta* for any species of *Sphæromphale*; and *Dermatocarpon Gorovaglii* for *Dermatocarpon pallidum*.—C. P. Smith, 9, North Street, Brighton.

WANTED, mounted for microscope, good specimens of the various parasites found on trout and salmon. Birds' eggs in exchange.—J. J. Armistead, Virginia House, Leeds.

LETTUCE AND LEEK SEED.—Send stamped addressed envelope and any object of interest to J. H. D., 49, Newlands Street, Everton, Liverpool.

PALATE OF WINKLE, in Balsam or dry, and rind of onion showing crystals, for other objects. Send list.—W. Overbury, Upper King Street, Norwich.

BRITISH LAND and Fresh-water Shells, in exchange for others of the same.—R. M. Ll., 60, Villa Road, Handsworth, Birmingham.

BRITISH BIRDS' EGGS in exchange for others (British).—Frank Hamilton, 34, Grampian Road, Edge Lane, near Liverpool.

MICROSCOPIC LEAF FUNGI, unmounted, for eggs of Parasites and Butterflies, unmounted.—H. Durnford, Claremont House, Waterloo, Liverpool.

FOR BRAMBLE BRAND, AND SCALES of Bream and Tench, &c., send stamped directed envelope, or any object of interest to J. Sargent, jun., Fritchley, near Derby.

EGGS OF *Bombyx Pernyi* for those of *Yama-Mai*, or for imagos of British Lepidoptera. Answer if accepted.—W. Tyson, 14, Hanover Street, Leeds.

For scales of Podura send object to C. Hurdell, 7, Great Cumberland Place, London, W.

BRAMBLE BRAND (*Aregma bulbosum*), for stamped envelope to G. E. Quick, 109, Long Lane, Southwark.

FOR Seeds of *Bladder Campion*, *Purslane*, and *Sphænogyne*, send exchange and stamped address to C. D., 187, Oxford Street, Mile End.

*Crisea eburnea* and *Plumularia cristata*, both with ovaries, mounted, for good slides of Foraminifera and Polycystina.—Miss Jelly, Albion Street, New Brighton, Cheshire.

WING-CASE OF DIAMOND BEETLE (*Curculio imperialis*), offered in exchange for unmounted objects of interest or material.—G. Bowen, 95, Hampton Street, Birmingham.

LONGITUDINAL section of *Rhamnus frangula*.—Send stamped addressed envelope to W. White, Monmouth. Any good material acceptable.

PORTIONS of wing of Foreign Butterflies mounted, in exchange for other slides of interest.—Send list by post-card. E. Ward, Freehold Street, Coventry.

## BOOKS RECEIVED.

"The Gardener's Magazine." Part 58, October, 1870.

"Land and Water." Nos. 245, 246, 247, 248.

"The Animal World." No. 13. October, 1870.

"Notes and Queries on China and Japan." Nos. 2, 3, 4, 5. Hongkong.

"The Forces of the Universe." By George Berwick, M.D. London, Longmans & Co.

"Boston Journal of Chemistry." October, 1870.

"The Canadian Entomologist." Vol. II. No. 9.

"American Naturalist." October, 1870.

"American Entomologist and Botanist." October, 1870.

"The Popular Science Review." October, 1870.

"Seventh Annual Report of the Belfast Naturalists' Field Club, 1869-70."

"The Monthly Microscopical Journal." October, 1870.

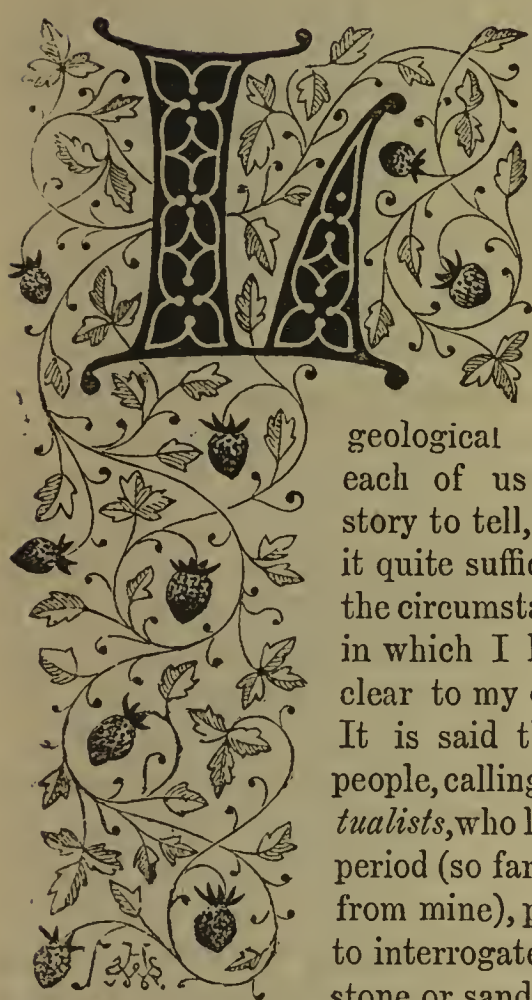
COMMUNICATIONS RECEIVED.—H. R.—W. B. H.—S. W. B.—W. N. E.—A. J. S.—P. L.—T. M.—E. J.—J. J. A.—R. E.—J. R.—J. S.—J. R. D.—I. C. G.—E. F. E.—W. B.—A. H.—W. L.—W. C.—L. S.—H. P.—J. E. F.—L. R. R.—G. M. I.—I. W.—A. J. M. A.—C. P. S.—Mrs. S.—H. C. L.—R. M. L.—J. H. D.—C. D. H.—W. O.—T. H.—R. M.—W. S.—F. S.—A. P.—F. H.—W. H.—G. H. H.—A. M.—H. E. W.—J. R. S. C.—W. W.—G. B.—J. S., Jun.—E. W.—E. C. J.—A. J. M. A.—E. L.—J. McL.—E. A.—C. D.—W. G.—A. B.—E. S.—G. E. Q.—G. B. C.—S. A. H.—C. H.—W. T.—J. S. R.—W. N.—F. V. P.—T. C. I.—R. T. M. A.—J. H.—M. J. W.—H. D.—T. R.—A. M. R.—F. S.





## THE STORY OF A PIECE OF SANDSTONE.

By J. E. TAYLOR, F.G.S.



LIKE my mineralogical acquaintance, the piece of limestone, generally I am about to do duty for a group of individuals common to every

geological formation. But each of us has a separate story to tell, and I shall find it quite sufficient to bring all the circumstances of the epoch in which I lived, sufficiently clear to my own recollection. It is said that a number of people, calling themselves *spiritualists*, who live in the present period (so far removed in time from mine), profess to be able to interrogate a piece of limestone or sandstone, and to get

its story in some easier way than by the ordinary cross-questioning of science! All I can say is, I wish the events of my own life were so permeated in my substance. If this theory be true, the modern science of geology will have to give up induction, and fling itself into the arms of the spirit rappers!

Every one of my listeners knows what a piece of sandstone is like. There is no need for me to describe my appearance, therefore, as novelists do their heroes. But how many thus familiar are aware that in ninety-nine cases out of a hundred, every such piece of sandstone was originally formed along the floor of old oceans? Those ocean-bottoms are now represented by dry-land surfaces, where the vegetation luxuriates on the mineral substances accumulated under such widely different circumstances. Even where no marine organic remains are present, as fossils, to prove the marine origin of the sandstones, that origin is none the less certain. I can-

not speak with certainty as to the nature and extent of the dry lands and continents of the epoch in which I was born. Suffice it to say they must have been great, for the rivers which watered them were large, and brought great quantities of mud and sand down to the sea. The ocean currents and tides also wore away the coast-line, and added to the quantity of loose sand and mud which accumulated under the waves in consequence. Thus it was that I was born.

My earliest remembrances are of my lying loose and unconsolidated on the ocean-floor, and of constant additions being made to the sheet of which I formed part. It was whilst I was lying in this state, as so much ordinary sand, that I received my impressions of what was going on around me. These consisted of a familiarity with the commoner animals which lived in the sea, or with occasional plants and vegetables which had been carried there by rivers, until they sank to rest in my bosom when they had arrived at a water-logged condition. Of these I will speak presently. Meantime let me make a few remarks as to the changes which transposed me from loose marine sand into hard sandstone. And in doing so, it will be evident that the same explanations will answer for the similar alteration of sandstone rocks, both of earlier and later geological periods.

The sand or mud brought down and laid on the sea-floor in the manner I have mentioned, was not of an absolutely pure character as regards its mineral composition. That is to say, it was not all silica, or alumina, as the case might be. In all instances the material was mixed with more or less of iron rust, or of lime, and free silica. The two latter acted as cementing pastes to those sandstone rocks which are now of a lightish colour; whilst the iron was the compacting agent with such dark red rocks as that of which I form part. Indeed, in most cases, even when the sandstone is of a light yellow, a small percentage of iron has gone a great way towards binding the loose grains of sand



together, and thus producing a hard rock. When this chemical agent has been equally dispersed through the sandy mass, you have the thick-bedded sandstone, or "free-stone." When it was intermittent in its action, or unduly mixed up, or occasionally alternated with something else, then the sandstone becomes "flag-stones" of greater or less thickness.

Sometimes you will see a mass of red sandstone more or less mottled. This has been caused, in most instances, by patches of vegetable matter—old world *fucoïds* or something of that sort,—which decomposed, and whose chemical changes combined with the iron, and locally prevented its colouring effect.

Of course it will be evident that our hardness or softness greatly depends on the percentage of cementing material, or to the different circumstances under which we were formed. I have no doubt that, when the chemical changes above mentioned were going on through an immense thickness of accumulated sand, the hardening process was greatly assisted by the pressure of the overlying volume of sea-water.

The epoch to which I belong is sometimes called the "Old Red Sandstone," and, occasionally, the "Devonian." The former term is given to our formation to distinguish us from the "New Red Sandstone," overlying the coal-measures; whilst the latter name is of local origin, and indicates that the system is largely developed in the lovely county of Devon. Indeed, that sunny land owes no little of its physical attractions to the various mineralogical structure of the rocks of our formation. Perhaps I can boast of the fact that there are few other formations which have such a world-wide extent as that to which I belong. In the United States it extends over an area nearly as large as Europe, there being one continuous coral reef included in it, which covers an area of nearly half a million of square miles. In Canada there is also a great extension of this formation, whilst in South Africa its area is greater still. In Russia one subdivision is much greater than the whole of England, and there is a large extension of beds of similar age in Asia Minor, as well as in Australia.

The original name of "Old Red Sandstone,"—given to the formation of which I am an humble part, was conferred upon the thick beds found developed in Herefordshire, Worcestershire, Shropshire, and South Wales, as well as others supposed to be of similar age in Scotland. In the former localities they attain their greatest thickness, which is between eight and ten thousand feet. There, geologists have divided the series into four divisions, of which the lowest may be said to blend with the underlying Silurian formation, and the uppermost with the succeeding Carboniferous. In Scotland the beds are not so thick, their greatest

vertical accumulation amounting to about four thousand feet. It would seem, therefore, as if the material which formed these rocks came from the south-west, thinning out in a north-easterly direction. In Devonshire, as well as in Ireland, there are two series of strata included in the same formation, which seem to have had quite a different origin. The former indicate a deep sea in which coral reefs abounded, and the latter tells us plainly of a large continent which existed towards the end of this epoch, on which there stood freshwater lakes as extensive as those of North America. Doubtless it was the same continent whose rivers contributed no little of the sand and mud which, when strewn on the sea-bottom, formed the sandstones of which I am part.

How shall I tell of the strange sights which I beheld when quietly lying on the ocean-floor! The sea-water had the same specific gravity it has now, and the constitution of the atmosphere was similarly formed. It is an error to suppose, as some have done, that there was mixed a large percentage of carbonic acid in the air before the Carboniferous epoch, and that this was absorbed, and the atmosphere cleared and rendered fit for animal life at the same time. The theory is ingenious, but there is not the slightest ground for believing it has any foundation in truth. Occasionally the sea-water became turbid and red, owing to larger quantities than usual of the refuse of igneous and metamorphic rocks being carried down by the rivers. As is well known, these contain large quantities of iron, which are easily decomposed, and enter into new combinations as oxides; whence my colour and also my cementing agent. The sea-bottom was covered with groves of *fuci*, or sea-weeds, in which a large crustacean, bearing some resemblance in its huge claws to the modern lobster, lived and left its spawn. The latter is actually found fossilized in our sandstones, and bears some resemblance to a flattened blackberry. Among geologists, I am told, it goes by the name of *Parkia*, whilst the huge lobster which left it, and which was at least six or seven feet long, rejoices in the name of *Pterygotus*. Several species of this common form are met with in Scotland, as well as in England.

But by far the commonest creatures which enjoyed life in the sea of my birth were the fishes. Indeed, my epoch has been justly called "the age of fish." In many places they swarmed in shoals. Most of them belonged to an order of which there are very few now living, termed the *Ganoid*, on account of their being covered with a series of oval or rhomboidal bony plates, instead of scales. These bony plates had an exterior varnish; whence their name. At present, I am told, there are several species living in the rivers of North Africa, and others enjoying life in the lakes and rivers of North America. But out of nine thousand species



of fish known to naturalists the *Ganoid* species only number about twenty-seven. Indeed, the wide geographical areas where the two outliers of this once numerous and world-wide family of fishes are now lingering, indicate their antiquity, and suggest how many geological phenomena have taken place to bring about their present geographical isolation. Few of these peculiar species have a solid skeleton properly hardened, as is the case with ordinary thin-scaled fishes. No doubt the strong, bony integument did duty instead. Indeed, among the fish which lived during my lifetime, scarcely any possessed a solid skeleton. The largest of these strange-looking fish is now called *Asterolepis*, from the star-like markings on each of the scales. It reached the entire length of between twenty and thirty feet. Other common forms were the *Holoptychius*, noted for its large oval scales being peculiarly wrinkled; the *Pterichthys*, or "winged fish," so called on account of its two pectoral fins, which are very large and resemble paddles, being placed near the head, where they look like wing appendages. The plates which covered this fish were very large, and ornamented by a series of granules.

Then came the *Cephalaspis*, or "buckler-headed" fish, so called because its queer-shaped head was encased in a shiny bony buckler, in form not unlike a cheesemonger's knife. Its trilobed body was covered with lozenge-shaped bony plates. The *Osteolepis*, or "bony-plated" fish, was the most abundant; its name being derived from the minute rhomboidal plates which covered its body, and protected it, like the links of an ancient coat of mail. Besides the fishes of this class, which, singularly enough, were further distinguished by their having the tail unequally lobed—and not regularly cleft as in the common herring and other scaled fishes—there were associated with them others, having an affinity with species of the Shark family. These are called *placoid* fishes, on account of the skin being a kind of shagreen, dotted with minute plates or points of hard bony matter. They also have a cartilaginous skeleton, as, for instance, the common skate, sturgeon, &c. Well do I remember these peculiar fish, ranging in size from the *Asterolepis* to the little *Onchus* and *Osteolepis*, of only a few inches in length! The quick, active movements of the latter, as they roamed in and out of the thickest of sea-weeds, caused the light to flash from their enamelled scales, and sometimes only too surely pointed out their playgrounds to their cestraciant enemies. They had their feeding and their spawning-grounds, and each of these places is now represented by the greater number of fish found fossilized in the flagstones, as in the Caithness flags, and the yellow sandstones of Dura Den.

Sometimes, also, great numbers were killed by unusual quantities of mud being poured into the

water and choking them, as a turbid river will, at the present time, suffocate the smaller of its tribes. How suddenly these died is indicated by the fact that thousands of fossil specimens are to be seen with their fins erect, like those of the *perch* when he is "struck." Others are contorted and bent, as if in pain; their last dying struggles having thus been faithfully handed down by the stony records in which they were imbedded.

Some few of the fossil fish of this period had *reptilian* characters in their teeth, &c., indicating, as it were, the next great family which should rule creation. Wherever the Old Red Sandstone has been met with, some, if not all, of these peculiar ganoid fishes have been found fossilized. Therefore, they are good indications of the geological age of any such formation.

I will not trouble my listeners with the dry, technical details of how the strata succeed each other in my parent formation. I want, if possible, briefly but vigorously to sketch the life-characteristics of that distant epoch.

I have thus far devoted myself to the fossil fishes, because of their abundance, and also of their very striking peculiarities. Now I come to other creatures, perhaps not less abundant, but not so attractive. I must premise, however, that such marine creatures as corals, mollusca, and trilobites were not very abundant over the area where I first saw the light. They delighted in clearer water, and so are to be found over the area where that stood. Indeed, generally speaking, those parts of the seabottom where most of the red muddy matter was poured in, were shunned by all forms of life, not excluding the hardier fishes. Hence it is you rarely find, in the very red sandstones, any organic remains or fossils beyond a few vegetable impressions. Of course there were various parts of the same sea thus distinguished by different physical circumstances, and life was developed, or located, accordingly. Let me, therefore, give you some slight account of the area where "blue water" was most in force, and where, in consequence, there were the most numerous assemblages of crustacea, shell-fish, and corals.

The localities in Great Britain where these peculiar fossils are found in strata of the age I am describing, lie chiefly in South Devonshire, as well as along the North Devon coast. At the latter place you may see beds of sandstone, red and yellow, alternating with slates, limestone bands, &c., the last-mentioned being especially full of organic remains.

The highest of the series go by the name of the "Pilton Group," and these are undoubtedly of the same geological age as the Devonian strata in Ireland. Among the fossil shells which lived during this epoch, and which occur at the above-mentioned places in the fossil state, the most numerous were



those belonging to the *Brachiopoda*. Indeed, these shells far outnumbered the ordinary conchifera, whereas at the present time the latter are equally in the majority.

Among the commonest of the shells I remember, were several species of *Spirifer*, *Stringocephalus*, &c., and also *Clymenia*, *Megalodon*, and others. The last was a lamelli-branchiate mollusc, allied to the oyster and mussel of the present day. Among the corals there abounded in Devonshire the *Favosites polymorpha*, or "many-sided" coral, as well as *Heliolites*, or "sun-coral," *Stromatopora*, &c. The latter my readers will readily recognise when I tell them it is the common pink or red variety usually bought at Torquay, and which, when polished in the mass for mantel-pieces, has such an attractive appearance. All of them are portions of reef-building corals, and well do I remember the animated appearance of the clear water when the "reefs" flourished in their bright colours, and trilobites, fish, and crustaceans swarmed around the busy pile. The *Trilobites* found in the Devonian limestones are of a peculiar type, equally distinct from those of the preceding Silurian period, or of the succeeding Carboniferous.

Among the commonest of the genera were *Bron-tes*, noted for its fan-like tail, and *Homalonotus*, equally distinguished by the double row of small spines running down the central lobe, and which give to it a more "trilobed" appearance than any other species in the whole family. But, clear though the sea-water generally was in which these Devonian beds were formed, every now and then shifting currents brought fine mud and other sediments. These were thrown down on the ocean-floor, where they alternated with the bands of limestone.

Eventually, the sea again maintained its purity for a long period, during which the corals and other clear-water-loving animals resumed their avocations, and left behind them traces of their work.

I have said that in Ireland there seems to have been a continent, or some other extension of dry land, towards the close of the age in which I was born. Of this I cannot speak with certainty; but the evidence is strongly in favour of the idea. In the county of Kilkenny are a series of fine-grained greenish sandstones, regularly bedded; they are full of evidences of fresh-water deposition. Nowhere, in Europe at least, will you meet with such well-preserved land-plants; all of which prove, by the perfect manner in which they have been preserved, that they could not have been drifted from a distance, or been in the water long. Among the most attractive of these remains are those of a tree-fern, formerly called *Cyclopteris*, or "Round-leaved Fern," but now named *Palæopteris Hibernicus*, or the "Irish Primitive Fern." Nothing could be more exquisite than this beautiful fern, even in a fossil state, and you may therefore guess how attractive were its groves

when it was the monarch of the primeval forests, and its graceful fronds bent over the clear waters of a lake which equalled in picturesqueness those of the Emerald Island of these times.

This fern is not unlike, in general appearance, the "Royal Fern" (*Osmunda regalis*), with the exception that it has no mid-rib—its veins ramifying from the base towards the exterior of the leaf. Associated with this tree-fern were great and small club-mosses, which trailed over the ground, and formed a rich green carpet of various tints. Among the commoner of these extinct club-mosses were *Sagenaria* (of which the seed-vessels and catkins are well preserved); *Psilophyton*, a simpler club-moss, and the larger and more tree-like *Lepidodendron*, which afterwards became so abundant during the Carboniferous epoch.

Besides these we have evidences of other kinds of vegetation, and there is no doubt that the higher grounds were more or less covered with more highly-developed and organized species. What is further corroborative of the fresh-water origin of the Irish sandstones is the immense number of bivalve shells, exactly resembling the large fresh-water mussels (*Anodon*) which abound in the English rivers. Both in appearance and structure these fossil shells are evidently closely allied, and therefore they are called *Anodonta*. They abound by thousands in some parts of the sandstones, associated with plant-remains, and those of crustaceans which seem allied to the modern crayfish. So long did these large Irish lakes exist, that mud was strewn along their bottoms, which ultimately formed rock several hundred feet in thickness. I am told that similar deposits of fine mud and shell marl are now going on along the floors of the forest-fringed lakes of North America.

Change the character of the vegetation and you have no indistinct restoration of the Irish Devonian lakes. Many of the fish would do; for the "bony pike," a ganoid fish, still lives there, associated with colonies of "swan mussels," clustering on the bottom.

So much for the brief outlines of my story. Much more could be said upon this remarkable epoch; but if I have given anything like an idea of how my origin was brought about, and of the character of the life-forms with which I was brought into contact, my business is done, and I accordingly retire for another geological speaker.

---

HELIX CARTUSIANA.—At page 261 of your SCIENCE-GOSSIP for November 1st, 1870, Dr. Halley writes, that he does not know any locality where this species is found. I find it in great plenty on the Downs near Lewes, and shall be most happy to send duplicates to Dr. Halley if he wishes for them, and would communicate with me on the subject.—*J. Jenner Weir, 6, Haddo Villas, Blackheath, S.E.*



## A BRIEF GOSSIP ABOUT BEES.

YOUR correspondent W. Holland is perfectly correct in disclaiming the credit of having been the first to discover that bees collect honey from only one kind of flower during the same journey; for I well remember seeing this fact noticed several years ago (long before the letters of the *Times* Bee Master appeared), in an old article entitled, I think, "A curious collection of facts respecting Bees." I am not perfectly sure about the title, but I am as to the circumstance; and I have a vague idea that Huber was mentioned as the discoverer. The fact itself is noticed in Chambers's "Encyclopædia," published ten years back; and I was exceedingly amused when Dr. Cumming's letters were first printed, by some of the remarks he made relative to the important part played by these wise little insects in the fertilization of plants. The worthy Bee Master seemed, from the way in which he worded his observations, quite oblivious of certain natural laws regulating the hybridizing of plants, laws which would, I imagine, have prevented the monstrous results he anticipated as likely to occur, if Providence had not endowed the bees with the instinct of confining themselves to one species of flower during each ramble.

The wise man has said "there is nothing new under the sun," and of a truth one feels disposed to endorse his remark, when, after looking at all the novel inventions and appliances used by modern Apiarians, a glance is taken in the direction of those ancient Bee Masters who gave bygone ages the benefit of their practical experience.

When I was a little girl—I don't care, gossip as I am, to say how long ago—I was taken from Bryn Môe, by a party of my mother's friends, to see some wonderful glass hives at the ferryside, belonging to Dr. Bevan. I had heard so much of the learned Doctor, who had "written a book about his Bees," that I really believe I was quite as anxious to see him as I was to view his wonderful insects; and I can as safely assert that I firmly believed the kind old gentleman in the blue-flowered dressing-gown, who gave me such an ample supply of cake, had invented the lovely glass houses I saw the bees at work in; until some years afterwards, I read that "a man of consular dignity, near Rome, had his hives made of transparent lantern-horn," in the days of Pliny. The same authority also informed me that "many persons have hives made of *mirror* stone for the purpose of watching the bees at work within."

"Bees must have *lived* a long time," was once said to me by an old Welshwoman, "for they are spoken about in the Bible."

"The Amorites came out against you, and chased you as bees do," is the text referred to; but what the old dame intended to express by "*lived* a long

time," was slightly puzzling; for I knew that had any one ventured to tell her there were folks in the world who thought that certain forms of animal life had existed on it before the Grand Old Gardener and his wife came upon the scene, she would have deemed them "worse than Papists" (this was another favourite expression of hers); therefore it was impossible to imagine, she thought, there had been any more recent creatures than those in Eden, and almost equally so to suppose she believed *the* bees alluded to in Deuteronomy, had not been fumigated to death long ago: however, she quoted the earliest notice made of bees in the Bible quite correctly, and Homer makes use of a like comparison when he describes the Greek forces.

It is customary in some parts of Scotland to remove the hives at the end of the season on to the moors, in order that the bees may gather honey from the heather bloom; and all readers of Pliny will no doubt remember Hostilia, the village on the banks of the Po, whose inhabitants took their bees up the river in boats at night, to seek for fresh pasture-grounds in the morning.

It is a strange thing that, although many of the ancients wrote about bee-culture very fully, they all mistook the reigning powers' sex (the Romans always spoke of the King Bee), until the time of Swammerdam, who, in 1669, published his "History of Insects;" and there states that from one female, the only one in the hive, all these kinds of bees are produced.

Aristotle had said that the Basileus of the bees was the parent, and Basileus is best interpreted by our word monarch; but Aristotle decidedly deemed the Basileus of the hive to be a female. This is evident from some of his observations; although he would have settled the point beyond all dispute had he written Basileia, which is synonymous with our word queen; thus the credit of discovering the sex of the ruler is given to Swammerdam.

The extensive notice we find of "Mead" and "Metheglin," in the days of the Druids, would lead us to believe that bees were domesticated by the Britons; but we have no authentic information on this point, and the honey used in their drinks may have been stored by wild bees. The Romans, when they came over, no doubt taught the Britons how to hive and domesticate; for we have sure record that the Anglo-Saxon successors of the Romans were Bee Masters, since, by the laws of one of their kings, it was ruled that every "ten hides of land shall furnish ten vessels of honey."

The mead made in South Wales in the present day is not so potent as that drunk when King Ethelwold restricted the monks of his monastery to a certain quantum to be drunk between twelve of the brethren at supper.

Howel Dhu, who was king of Wales in A.D. 940,



or somewhere about that period, made a code of laws relating to bees, fixing the various prices of a hive at different seasons; and so highly was mead thought of some thousand years ago, that the Mead-maker ranked in the Prince of Wales's household next to the Royal Physician.

One quotation more from these old works, and my gossip shall close.

"Bees were first born in Paradise, and were driven thence on account of man's sin, but God blessed them; therefore Mass ought not to be sung without their wax being present."

*Beaumaris.*

HELEN E. WATNEY.

### "KILLING IS MURDER."

ONE of the greatest evils in the study of entomology is the continual necessity to take away life; the astronomer, chemist, and geologist can prosecute their studies without alloy. It is true the botanist deprives a plant of life, but it can be fairly presumed that in so doing he does not inflict pain. Some think it is quite possible to study insects without putting them to death; but it is not sufficient for a lover of the science to meet with a new specimen, examine it, and let it go; he wants to take it home and put it in his cabinet. Other entomologists try to get over the difficulty by either denying there is any sensation at all, or that the sensorial faculties of an insect are of such a low order that it cannot be compared with that which exists in man. Truly this is a comfortable way of looking at things, and smooths over the thousands of deaths at the "stake." Foremost in this respect are the veterans in the science, Kirby and Spence. Take the following quotation:—

" . . . The poor beetle that we tread upon,  
In corporal sufferance finds a pang as great  
As when a giant dies."

I can only see one interpretation of this: that the beetle suffers as much from the injury as a giant; but now read the unaccountable perversion. "Shakespeare's intention, however, in this passage was evidently *not, as is often supposed, to excite compassion for the insect*; but to prove that *the sense of death is most in apprehension*," the actual pang being trifling. I should like to know what kind of apprehension a beetle is subject to before being trodden under-foot, and would simply suggest that he has none, but would most assuredly feel it when trodden upon. The same bias of mind seems evident a little farther on in watching the actions of insects after mutilation; writhing agony after dismemberment is described as "dancing." Supposing a *Tipula* leaves half its legs in the hands of an unlucky boy, it has the power left to fly away, and does so, even with "agility;" but why say it is "unconcerned"? A savage impaled by a stake would, no doubt, if he could get at him, half eat his neighbour; but would

it not be a fearful mockery to say he ate with as much avidity as when at liberty? It is a known fact that muscular strength in insects is carried to an extraordinary degree; and it is but natural that contractions, sometimes of a violent nature, would set in after decapitation, causing the jaws to move (which is termed eating), or the strong muscles to eject the sting. From a like cause the anecdote of the dragon-fly caught at Whittleseamere by J. F. Stephens, and recorded by Kirby and Spence, proves nothing. If an ant will walk without its head, I answer so will a chicken; but perhaps it will be urged that the latter is fond of the operation. I am clearly of an opinion, although quite different to many entomologists, that nothing has been brought forward to prove that insects do not experience great pain under the operations they are subjected to, and that it is a reproach to our intelligence not to recognize the fact.

In the recent article entitled "Killing no Murder," it is stated that in insects "we can find no central brain, no concentration of nerve-matter, upon which anatomists tell us depend all the various sensations experienced by us and the animals most resembling man. Insects have nerves scattered over their bodies and united in certain knots or ganglia, yet from these no telegraphic indications are passed to or received at a central point, be it ever so small." I should very much like to know how this conclusion has been arrived at. Why say so vaguely that *somewhere* in the head of an insect resides a power of volition, &c. My little experience has been very different. I have been accustomed to read in books, one particularly, "Lardner's Animal Physics," where there are six illustrations of a beautiful nervous system in insects. If these are allowed to be correct, there certainly is a central brain and a concentration of nerve-matter, and its position may be well known if we choose to make ourselves acquainted with it. The mere act of walking shows that there is a telegraphic movement similar to that in man; and if we admit one system of nerves, why not another, that of feeling?—especially after watching the antennæ. The functions of the nervous system in insects remain to be investigated by some "Harvey,"—who, like him, will meet with every opposition in his efforts to reveal a truth.

I hope some of your readers will not be deterred from endeavouring to throw additional light upon a subject that must be at the heart of every true lover of nature.

THEODORE CHARLES IZOD.

*Upper Clapton.*

WINTER MARTIN.—While walking on our Esplanade this morning (Nov. 18), I saw a martin flying briskly about, brought out (from where?) by the bright sunshine we are this day enjoying. I much fear his breakfast, lunch, and dinner will be of the scantiest.—*W. Hambrough, Worthing.*



## THE LOCUST-TREE.

IT is a remarkable fact, and the mere statement affords a sad commentary upon the general imperfectness of human knowledge, that mankind should remain in doubt as to the true reading of Matthew iii. 4, and Mark i. 6; where both evangelists describe St. John as supported on "locusts and wild honey."

The scriptural statement is quite clear that the insect *Acridium*, or locust, is intended—it is ἀκρίδες ἀκρίδας in the original; but tradition has obstinately substituted the fruit of the locust-tree, *Ceratonia siliqua*, or St. John's bread, as the substance really intended.

This error appears to have originated with Eastern monks, who not being fully informed as to the real usage of Syrian and Arab, have interpreted the words of Scripture by the light of their own tastes and habits.

Our word locust is from the Latin *locus ustus*, a burned place, *i.e.* "wasted;" and it is so used in the Vulgate. It clearly refers to those migratory insects of the grasshopper or cricket kind, which naturalists classes *Locustidæ*, *Gryllidæ*, *Ædipoda*, and the *Acridium*. However unsuited to our notions may be such food, it is different in the East; and in Leviticus xi. 22, the locust is especially pointed out as fit for food. The words used are as follows:—

I. אַרְבֵּה, *arbeh*; it implies "sudden invasion," and is rendered in the Septuagint by βροῦχον, from βρῦξω, "I gnaw."

II. סִלְעָם, *salam*; which implies "to swallow up, to destroy." Septuagint, ἀττάκην, from ἄττω, "I spring or jump."

III. חֶרְגֹל, *chargol*, implying "terror, horror;" Septuagint, ὀφιομάχη (Hebrew, אֹב, *anb*), from ὄφης, snake, and μάχη, a combat; *i.e.* "hostile to the snake."

IV. חֶגַב, *chagab*; implying "food." Septuagint, ἀκρίδα, from ἀκρίνω: 1. unarranged, disorderly, lasting, unceasing; or 2. indiscriminate, immense; the migratory locust, from its unlimited numbers.

The Hebrew words, thus explained by the seventy elders, convey just the ideas which we associate with different varieties of locust. Thus sanctioned by the Levitical law, we find the practice continued to the present time, as described by many travellers.

Hasselquist, a Swedish naturalist, who died in 1752, has fully described the custom. They are ground or pounded, mixed with flour and water, made into cakes, salted, smoked, eaten boiled or roasted, stewed or fried, cooked with butter as a dainty fricassee. With these statements before us, we need not doubt that the Baptist did eat locusts;

although monkish narrators may have thought it more proper for him to have eaten the long sweet pods of the so-called St. John's bread.

Locusts and wild honey! What an idyllic picture. Not very dainty fare, according to European notions, but it may yet form a popular *dîner à la [Sy]riuse*, where animal food is a secondary consideration. Then the hirsute man, roughly clad in skins, and muttering to himself, with the pressure of thoughts, that but occasionally found vent before a sympathetic crowd.

The Evangelists state that he lived in the desert, supporting himself on what he found; we may allow him some choice of cookery out of the variety described above; he was not bound to eat his locusts raw.

I mention this, because Mr. Lord, an eminent naturalist and traveller, apparently inclines to the idea that St. John did eat the carob-bean. See *Leisure Hour* for August, p. 553, where he describes "the long scimitar-like pods, hanging in great bunches from the pendent branches... like... a goodly crop of scarlet-runner beans growing upon a tree." The true locust-tree is *Ceratonia siliqua*, it belongs to the *Leguminosæ* or Bean tribe. It is called the Algarob-bean, *i.e.* Al-kharoub, the carob, much used for feeding horses and fattening cattle, à la Thorley. The English locust-tree is a spurious acacia, known as *Robinia pseud-acacia*, introduced from North America.

25, Paternoster Row.

A. HALL.

## ON THE HYBERNATION OF HYDROCHARIS.

DR. LINDLEY, in his *Physiological Aphorisms*, says that in some plants, a bud, when separated from its stem, will grow and form a new plant, if placed in circumstances favourable to the preservation of its vital powers. But this property, he adds, "seems confined to plants having a firm, woody, perennial stem." There are plants, however, far from possessing a ligneous structure, with regard to which the aphorism holds good, and buds detached from them, in the course of nature, retain their vitality for months. The process is, in fact, designed by Nature for the preservation of the species.

The Frog-bit, *Hydrocharis morsus-ranæ*, which covers some ponds in this neighbourhood during the summer months, rarely flowers, and therefore does not propagate itself readily by the method common to phenogamous plants,—that is, by seeds; but it must have some means of doing so, for we see, summer after summer, the same ponds covered with the plant, although probably for several preceding seasons we have sought in vain for a single flower. Before inquiring into those means, let me



say a word about the plant itself. It is a floating plant, with petioled, reniform, entire leaves, and sends down long radicles, or roots, from its horizontal stems. These roots, however, never penetrate the soil. If the reader will examine a fully-developed plant, he will find that it extends itself in a manner somewhat similar to the strawberry, but with this difference: whilst the strawberry sends out runners, which take root and produce new plants, in *hydrocharis* a stem is produced from the crown of the plant, of variable length, which bears at its tip a solitary bud. This, in fact, is the nucleus of a new plant. At first the bud is exceedingly rudimentary, but it increases in size as the stem which bears it strengthens. It in course of time expands, leaves are thrown out and attain a rapid development, whilst from the base of each leaf springs another bud; and this process would go on indefinitely, were it not checked by the approach of winter. Thus, it is common to find long strings of these plants so matted together that it is difficult to separate them without injury.

Now, as to the means by which *hydrocharis* is sustained during the frosts of winter. In the autumn the development of buds is arrested. The parent plants decay, but the buds, retaining their vitality, fall to the bottom, and there rest until the ensuing spring. I was aware of the existence of these resting buds long ago, when I used *hydrocharis* as an aquarium plant, but was ignorant of their nature. I supposed—not having made very close observation—that the plant having flowered, the peduncles, as in the little *Ranunculus hederaceus*, became deflexed, so as to bring the seed-vessel beneath the surface of the water, and that, upon reaching maturity the capsules fell off and remained at the bottom of the pond during winter. I happened, however, to place in my tank several plants which I knew had not flowered; yet, as the season advanced, I observed the capsule-like objects upon the tips of their peduncles. A little reflection convinced me that they were not capsules at all, but undeveloped buds. I found this to be so upon dissecting a specimen. Each bud was an individual *hydrocharis*, in miniature. There were rudimentary leaves presenting the same form as those in the adult,—but of course very small,—with the same peculiar variation, the whole being interleaved with membranous stipules, and so compact that whilst water was allowed to penetrate amongst the leaves (that being necessary for the retention of vitality) they could not suffer by being knocked about whilst lying in this dormant condition. The outer covering was of firmer texture than the rest. The whole structure of the buds I found resembled that of the winter leaf-buds of terrestrial plants.

The buds of *hydrocharis*, as before stated, being of greater specific gravity than the water, sink to

the bottom in autumn. If they did not do this, the first frost that came would probably destroy them. As it is, nature has placed them beyond the reach of the frost, and, as spring advances, the greater warmth imparted to the water by the rays of the sun sets in motion their dormant vitality: they again rise, and as we look upon the surface of the pools where we have so often been pleased by the sight of this favourite plant, we find them again covered with its lovely foliage. I believe the same hibernating habit extends to other water-plants, such as *Myriophyllum*, *Stratiotes*, and *Utricularia*.

Manchester.

J. C.

### THE LOTUS.

IF you have yet half a column to spare for so small a matter, I should wish to observe that to ask for evidence to *remove* is not, strictly speaking, the same thing as to *complain* of—antiquity.

I could not find in the frescoes at the British Museum, nor on searching Sir Gardner Wilkinson, sufficient evidence for the statement in the guide-book provided for the public instruction at Kew Gardens, that the *Nelumbium speciosum* of botanists is identical with the "Sacred Lotus" of the Egyptians. The great authority I quote disputes this identity; and the frescoes, representing other natural objects with singular felicity, fail to supply one recognizable drawing of the plant in question. Your correspondent, studying the same books and pictures as myself, cannot help me, and is content with ambiguity; and so, for that matter, am I, when I cannot remove it by further information. Under many circumstances, ambiguity is rather to be rejoiced at than lamented:—except for ambiguity, both of fact and expression, the Pasteur-Pouchet-Bastian-Beale controversy, for example, might die of simple atrophy, which would be melancholy indeed.

I am now content to be assured that the "Lotus" was a "sacred" flower among the Egyptians, as an emblem of a certain god; just, may be, as the "Rose" is sacred among us as an emblem of our great goddess Britannia; and that the "*Nelumbium*," whose fruit certainly nearly resembles in form a poppy-head, was used as food by that ancient people. But as far as direct evidence goes, it appears to admit of at least a shadow of doubt whether the latter is Egyptian at all; while, to ordinary mortals, it is surely very unlike a "bean," and it is *certainly not* the object generally known as the "Sacred Lotus of the Egyptians." Q. E. D. For all which, in consideration of the dignity and reputation of this beautiful flower, I am truly sorry.

C. V. W.



## THE COMMON HEDGEHOG,

*Erinaceus Europæus*,

IS, by writers of the present day, stated to be an animal but poorly endowed, as to active offensive movements, in the obtaining of its sustenance, the animal food on which it is well known it principally feeds.

In proof that such opinions are those now held, I shall quote from Mr. Bell's "British Quadrupeds." He says of this spine-defended creature: "Deprived of all means of attacking its enemies, of defending itself by force, or seeking safety by flight, this harmless animal is yet endowed with a safeguard," &c.—alluding to the sharp spines and means of erecting them by the skin-muscle—the *paniculus carnosus*—by which the creature passively resists attacks. Now it appears to me that the platitudes which have been written as to the hedgehog's helplessness and extremely inoffensive character are not worthy of credence. The hedgehog's lumpy exterior is not by any means a measure either of his activity or of his mental capacity—in other words, either of his quickness or of his intelligence.

Although, as is well known, the hedgehog feeds on the larger-bodied insects, on worms, and on fat mollusca, he is by no means satisfied with such aliment, but actively forages about in search of more substantial fare, and this with voracious appetite. His habits are, however, nocturnal, and he is assisted in his quest by his keen ears, his quick sight, his fine sense of smell, and his sensitive and cartilaginous snout, so useful in digging. His feet, with five toes each, and these armed with sharp, long claws, are very effective, not merely in capturing, but also in rending his prey, as may be easily witnessed.

A redbreast, which came into my house a few days ago, took refuge in a small fernery, or greenhouse, near a dining-room window. Here he had room to fly about, and he soon became very familiar, eating his food—bread and meat—from a plate, and making himself quite at home. He roosted at night on the wire of a plant-stand, about eight inches from the floor. A young hedgehog, only seven inches and a quarter in length, and which weighs but twelve ounces and two drachms, was rescued from a dog, and placed for safety in the conservatory with the bird. The hedgehog was given for his supper a piece of roast mutton, fully six drachms in weight, and yet he nevertheless succeeded in capturing and completely devouring the robin during the night, merely leaving the strong wing and tail feathers. In the morning piggy was so far from showing satiety in appetite that he was able to eat another portion of mutton fully an ounce in weight.

Surely we may, with such an example before us,

credit some of the popular stories as to this animal's greediness as to food and destructiveness to young game—stories that have been discredited by our scientific inquirers.

J. H., M.D.

## FLIES IN LIQUOR.

IT is a very extraordinary fact that flies have been known to remain immersed in strong liquors even for several months, and afterwards, on being taken out and exposed to the air, have again revived. Some, we are told by Dr. Franklin, were drowned in Madeira wine when bottled in Virginia, to be sent to England. At the opening of a bottle of this wine at a friend's house in London, many months afterwards, three drowned flies fell into the first glass that was filled. The doctor says that, having heard it remarked that drowned flies were capable of being revived by the rays of the sun, he proposed making the experiment. They were therefore exposed to the sun upon the sieve which had been employed to strain them from the wine. In less than three hours, two of them by degrees began to exhibit signs of life. Some convulsive motions were first observed in the thighs: and at length they raised themselves upon their legs, wiped their eyes with their fore-feet, and soon afterwards flew away. The Rev. Mr. Kirby informs me, that he has made the same observation on flies taken out of home-made wines. He says that many have recovered after having been twelve months immersed.

Such is the account given by Bingley (*Animal Biography*, iv. 193, ed. 7) of this singular phenomenon, for the accuracy of which the honoured names of Franklin and Kirby are no doubt sufficient guarantees.

It was my fortune, many years ago, to witness an instance of this apparent departure from the ordinary laws of nature. It happened thus: my father took me and other members of his family to Portsmouth, to bid adieu to my brother, lately appointed midshipman to H. M. frigate *Wanderer*. We stayed at the George, the principal hotel, where in due course dinner was served, and among the beverages was champagne. On pouring out the first glass, a common fly was seen to pass out with the wine. My father, whose glass it was, at once transferred the insect to the table, where it lay motionless, the fluid draining from it on to the cloth. What was the surprise of the party, some ten or fifteen minutes afterwards, to have their attention called to the fly, and to see it gradually raise itself from its recumbent posture and totter slowly, as drunken flies are wont to totter, across the table. There was no mistake in the matter; it was, beyond dispute, the identical insect which shortly before had been tightly wired and corked down in a bottle of champagne.



I was too young at that time to have thought of treading "the flowery paths of science," nor were any of the party of an entomological turn of mind; the matter was not therefore more closely investigated. All that was done was to perpetrate divers mild witticisms, anent "perjured Clarence" and the butt of Malmsey, and to affect great wrath with the waiter for producing wine made from the native gooseberry, and but lately transferred from the cask to the bottle. This of course was intended as a mere joke; my father was much too good a judge of wine, and the hotel itself was of too high a standing, to permit us to think that such a paltry imposition could be effected, even if it were practicable.

So ended the matter at the time. It occurred (as I observed above) many years ago; but it made an indelible impression on my mind, and I have often thought of it since as a striking instance of a phenomenon which is to me perfectly inexplicable.

Havre.

W. W. SPICER.

#### THE STATOBLAST OF PLUMATELLA.

THE paper on *Plumatella repens* in SCIENCE-GOSSIP for October, briefly notices the Statoblast as one form of reproduction, and having a number of them at this moment in my aquarium, I have sketched a few in various stages of development.

First let me observe that the Polyzoa are reproduced in three ways.

1. By true ova.
2. By gemmæ, or bud-development.
3. By statoblasts, or winter ova, which remain for a considerable time inactive, and usually develop in the first warmth of spring.

The commonest form of *Plumatella* is well represented by Mr. Hammond, and in this month the surface of most quiet streams and ponds will yield an abundant supply of Statoblasts, tiny brown dots to the unassisted eye; but with a good pocket lens, a reticulated surface is revealed, the darker border enclosing a lighter oval.

These winter-eggs, or Statoblasts, were secreted within the tunicata of the Zoophyte, growing like buds upon the funiculus, or small cord, which attaches the stomach to the *endocyst*, or inner tunic. This will be better understood and appreciated by considering the internal structure of this class of Zoophytes, which are such valuable additions to the fresh-water aquarium, so easily procured, so exceedingly lovely under the simplest microscope.

On the surface of a pond, the leaves of *Lemna* are studded with these minute bodies from September to April. I had a number in my small aquarium last month, and a fortnight ago observed that one

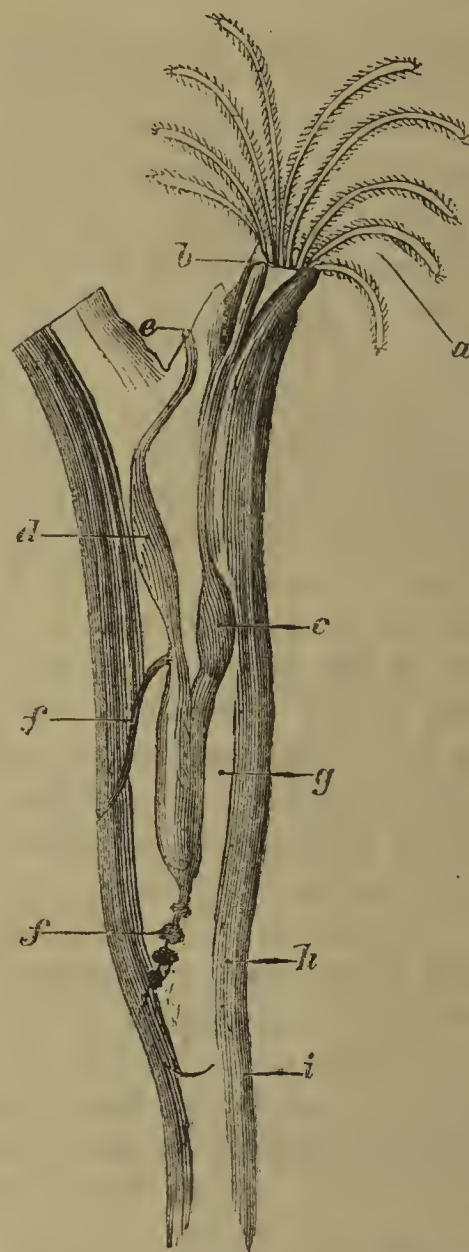


Fig. 218. The *Plumatella* magnified. The internal structure. a. Polyp emerging from its tube; b. lophophore or membrane from which the tentacles radiate; c. cardiac cavity of stomach; d. pyloric cavity of stomach; e. the rectum; f. funiculus; g. perigastric space between the alimentary canal and the endocyst; h. endocyst, internal coat or tunic; i. extocyst, external coat or tunic.

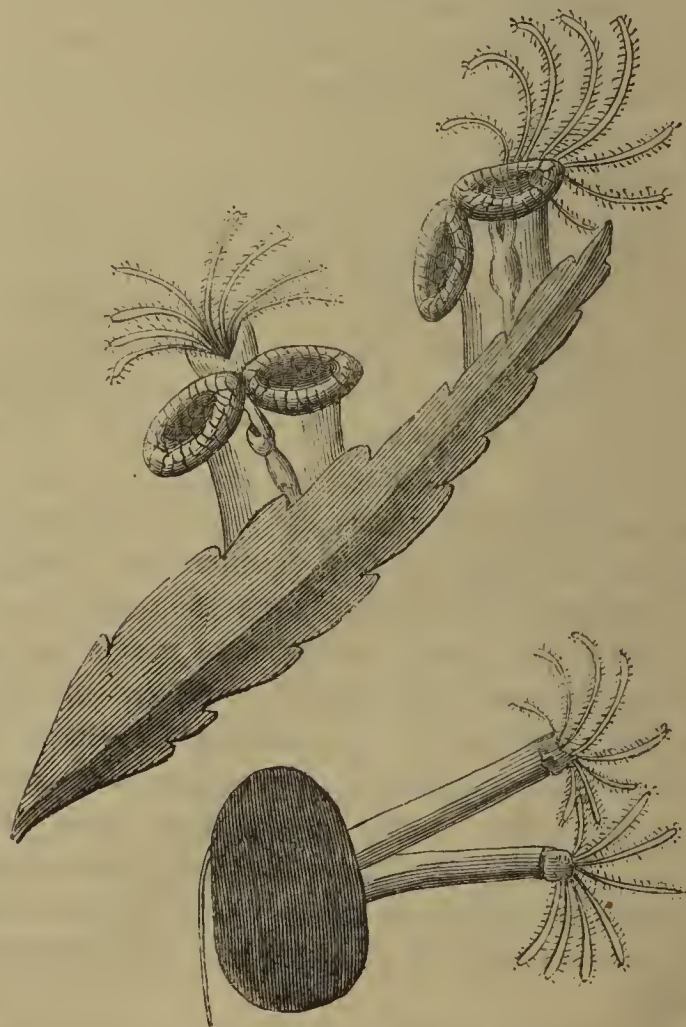


Fig. 219. The Statoblast developing.



of them had opened, and was crowned with a most beautiful circle of tentacles in full action, feeding on infusoria—Monads and Panamecium; this was on September 21st. On October 5th the position had changed; one side of the shell has nearly dropped off, the Plumatella has enlarged considerably, and being close to the glass, I can see the action of its tiny stomach.



Fig. 220. The tunic of a dead Polyp filled with Statoblasts.

In another part of the aquarium, just protruding from beneath a Lemna leaf, are two Polypes in semi-transparent tubes. The heat of the sunny south window has, no doubt, caused this premature hatching of Statoblasts, though the glass is shaded with brown paper.

L. LANE CLARKE.

#### GRIMMIA UNGERI, *Juratzka*, 1862.

A new European Moss discovered in Aberdeenshire.

ABOUT the end of May last I came upon a *Grimmia* which had an unfamiliar aspect; it was growing in great abundance, forming large, compact, dark greenish-grey tufts, and fruiting freely. The capsules were of a deep brown or chocolate colour; were over ripe; had shed the calyptra, and, in most cases, the lid. As the locality in which I found the plant was not very far from Ballater, Aberdeenshire, in the neighbourhood of which Messrs. Roy and Barker had, in the preceding summer, discovered barren specimens of *Grimmia montana*, my first impression was that I had come upon *Grimmia montana* in fruit; but the fact that *Grimmia montana* is one of the dioecious mosses, the fruit of which is rare, and the abundance of fruit in this case, awakened some suspicions in my mind as to the identity of the two, suspicions which at once subsided on my remembering that in the case of *Grimmia unicolor*, in the Clova station, scarcely a barren tuft is to be seen, although this moss also is dioecious. On examining the Ballater

plant after my return, it proved monœcious; and this, in spite of the warning colour and texture of the capsule, misled me into believing it to be only a very extraordinary form of *Grimmia Donniana*. In July I carefully re-examined it, and found a solitary calyptra, which being dimidiate, thus separated it from the Leueopheaca group of the Reetisetæ, just as the monœcious inflorescence separated it from the Commutatæ group, as defined by Schimper. It appeared to me to stand as a connecting link between the two groups, and, finding it different from all the *Grimmiæ* known to me, I issued it to several of my correspondents under the name of *Grimmia intermedia*. About a month afterwards I came upon Juratzka's description of *Grimmia Ungerii*, a moss gathered by the late distinguished Dr. Unger on Mount Olympus, in the island of Cyprus, and at once perceived that the two mosses were identical. I then sent specimens to Juratzka, and he has confirmed my opinion; so has Mr. Wilson, on my sending him specimens of the moss from Cyprus and Ballater.

*Grimmia Ungerii* will be fully described and figured in the *Journal of Botany* by-and-by, so that it is only necessary to state here that it can at once be distinguished from *Grimmia Donniana* by the much larger tufts, the dimidiate calyptra, and the deep brown (not pale yellow) capsule; from *Grimmia alpestris*, which it closely resembles, and from *Grimmia montana*, by the monœcious inflorescence.

The discovery of *Grimmia Ungerii* adds another species to the list of European mosses. Besides this, it has other points of interest; it has only once been gathered before, and then, as already mentioned, by Dr. Unger, whose life was so brave, and whose death was so sad. In Cyprus it is a purely littoral plant; in Aberdeenshire it occurs at least forty miles inland, and at an elevation of 1,500 to 2,000 feet above the level of the sea. Like *Plantago maritima*, *Silene maritima*, *Statice maritima*, *Cochlearea*, *Lychnis alpina*, and other flowering plants, though its true home seems to be "within the hearing of the waves," it, at the same time, is to be met with most unaccountably on the loftiest ranges in the land. In all probability it will be found elsewhere in Britain, and should be carefully sought for on Hobcartin Fell, Cumberland, on Bernam Hill, and on the Greenhill Strathdon.

Clova, with the Aberdeenshire mountains immediately adjoining, is the rendezvous of the *Grimmiæ*. With very few exceptions, all the British, and by far the greater part of the European species, have congregated there within a very limited area. Place yourself at the Queen's Hut, close by Loch Muick, and within a circle with a radius of about eight miles, you have, besides the commoner species, such rarissimæ as *Grimmia atrata*, *elongata*, *unicolor*, *commutata*, *montana*, *contorta*, *ovata*, *robusta* or



*ambigua*, *elator*, *Hartmanii*. It is also probable enough that more specimens of *Grimmia Mühlenbeckii* in the possession of Mr. Mitten, and gathered in the Aberdeenshire mountains, were gathered here. Nor are these the only treasures of this Arabia Felix of the botanist. *Tetraplodon angustatum*, *Tayloria serrata*, *Bartramia seriata*, *Bartramidula*, *Cinclidium*, *Catoscopium*, *Anacalypta latifolia*, *Leptotrichum glaucescens*, *Leptotrichum zonatum*, *Mnium cinclidioides*, *Dicranum glaciale*, *Barbula Drummondii*, *Sphagnum curvifolium*, *Fontinalis gracilis*, *Limnoleum dilatatum*. These, and many other gems, are among the treasures of this spot.

Can the proud Bed Lawers, about which British muscologists have for some years gone mad, show a braver list than poor old Clova, which has been so stupidly neglected since the days of Don and Drummond?

REV. JOHN FERGUSON.

*New Pittloco, Aberdeenshire.*

#### BIRDS OF NORFOLK.\*

MANY years ago, when Mr. Stevenson began to collect materials for an avifauna of Norfolk, he probably did not think that they would swell to three thick octavos; but since the publication of the first portion (which immediately obtained a high local reputation), so many fresh observers have been desirous of contributing to this popular work, that its fame has increased, and it may now be looked upon as something more than a scientific treatise.

Mr. Stevenson writes, not only for the naturalist, but for the sportsman. Speaking of the woodcock, he observes:—"In the memorable flood year (1852), amongst other ornithological phenomena, an almost unprecedented quantity of cocks were killed in the month of December." (ii. p. 285.)

He is one of those careful observers who lets nothing slip. Many of his notes on migration are exceedingly valuable. He shows that some birds, hitherto supposed to be residents, are in fact partial migrants; one evidence of which is their constantly killing themselves against lighthouses.

In a great game-preserving county like Norfolk, raptorial birds are naturally scarce; and passerine birds increase in a corresponding degree, as plantations spring up.

No one can read the "Birds of Norfolk" without perceiving that its author is a practical out-door naturalist, with a thorough knowledge of his subject. It is a book full of information. Some of Mr. Stevenson's descriptions of habits, &c., are not to be surpassed, and have the freshness of "White's Selborne."

The Collared Pratincole, a "rare straggler," is recorded as "having occurred several times" (p. 64);

but no very authentic instance has yet been obtained of another exceedingly elegant bird—the Cream-coloured Courser—which, in Tunis and Algeria, trips lightly over the sand, and is a true denizen of the Sahara.

Every species is treated with the same painstaking accuracy, and a full description is added of the famous "meres," locally termed "broads." These remarkable spots teem with wildfowl, and, by making repeated visits to them, Mr. Stevenson has elicited an amount of information never before made public.

It must be obvious that a work like the present will be of immense use to East Anglian zoologists, who, it is to be hoped, will not fail to contribute their share of information for the part which remains unpublished.

The Buff-backed Heron is now inserted for the first time in the Norfolk list, on the authority of Mr. Joseph Clarke (p. 151). Mr. Stevenson has not had an opportunity of personally inspecting the bird, and as there is as yet but one other authentic instance of its occurrence in the British isles, it requires strict investigation.

We can cordially praise the article upon the common heron (p. 130). The Bittern is also very ably treated, and must be an object of great interest to local naturalists; but Mr. Stevenson writes about these home species with a thorough knowledge of his subject. Whatever he states is stated from personal observation, and this is the great advantage which a work like the "Birds of Norfolk" has over a mere compilation.

We understand that the first volume has met with a favourable reception in all quarters, and we can only say that the second appears to be equally good, if not better. It is concise and able, free from error and elegantly written, and embellished with plates of the Great Bustard (*Otis tarda*), Thetford Warren and Breydon "Flats,"—the last-named being the only tidal "broad," and where more rare birds have been killed than in any place in Britain.

THE ARBUTUS.—We are not able to ascertain precisely at what period the Arbutus was first cultivated in England. Dr. Turner says that he had not seen it in this country in 1568. Gerard also describes the tree in 1597, but he does not say that it was then planted in our gardens. Parkinson notices, in 1640, that "it came to us from Ireland." Evelyn observes, as late as the time of Charles II., that "the Arbutus is too much neglected by us, making that a rarity which grows so common and naturally in Ireland." It is found growing spontaneously on rocky limestone situations in the West of Ireland, particularly in the county of Kerry, near the Lake of Killarney, where the peasants eat the fruit.—*Sylva Florifera*.

\* "The Birds of Norfolk," by H. Stevenson, vol. ii. Van Voorst.



## ZOOLOGY.

AN ENTOMOLOGIST'S PARADISE.—About nine miles from Kinloch Rannoch (Perthshire), on the south side of the loch, is a thick dark pine forest known as the Black Wood, a relic of the great Caledonian forest; many of its trees being of great age and so large as to require the outstretched arms of two men to span them. In the damp air of this forest, where there is an abundant supply of vegetable food in all stages of decay, favoured by the intense heat of summer and the long period of winter torpor, an astonishingly large number of subalpine insects occur which are unknown elsewhere. It is in fact the paradise of the entomologist, for though the species are rare, the number of individuals is unusually large. Many of them are of considerable size and possess very attractive colouring, while others exhibit curious habits and modes of development. The *Formica congerens* builds its huge ant-hills of pine needles here as in Norway. One of the most abundant insects in the place is the Longicorn beetle, *Astynomus ædilis*, which is known in Sweden, and, strange to say, in Rannoch also, as the Timberman, on account of its frequenting the timber-cutting yards and even the door-posts of the houses. Its horns are prodigiously long, about four times the length of its body, and remind one more of tropical insects than any similar development that occurs in this country. *Trichius fasciatus*, known to the villagers as the Bee beetle, from the resemblance of the velvety black bands on its yellow downy body to those of the common humble bee, is also frequent in the neighbourhood.—*Rev. H. Macmillan, Holidays on High Lands.*

A RASH KINGFISHER.—It is not uncommon for birds to dash themselves against plate glass windows, to them invisible. An unusual instance, however, occurred on the 10th October. I was in the dining-room of my house in Priory-row, nearly the centre of Coventry, when I heard a blow against the window next the garden. On looking for the cause, I saw a kingfisher lying apparently dead on the turf beneath the window. On taking him up I found that although stunned with the blow he was still alive. I placed him in a basket until I went out for my afternoon walk, when I took him into the country and released him near a stream. He flew away apparently none the worse for his adventure. I never before heard of one of these beautiful little birds wandering into a city. I expect he must have come up the stream of the Sherbourne to the Pool Meadow, where it is culverted, and then becoming confused lost his way and wandered into my town garden.—*John Gulson.*

STARLINGS.—Those who are in the habit of taking country walks must have noticed the unusual number of starlings to be seen this autumn. In the space of a few miles I have several times observed four or five large flocks of these birds. The quantity of worms, grubs, and insects devoured by them must be something incredible. It is curious, when a flock is feeding, to observe the careful way in which they beat over the ground—the birds from the rear continually flying over to the front, and each bird carefully clearing every inch of the ground where it has settled before it again takes wing for the front.—*John Gulson.*

“HELIx CARTUSIANA.”—In reply to Mr. Halley's communication in last month's SCIENCE-GOSSIP, where he seems to doubt the existence of *Helix Cartusiana* on the Deal sandhills, I feel bound to state that I am quite certain as to the identity of those collected there as lately as the spring of 1869 by myself. I sent a portion of them to an experienced collector of British shells, and have his note on the subject by me at present; I have also compared them with the *H. Cartusianus* in the British Museum. The snails bury in the sand during cold or wintry weather; and, as far as my experience goes, are very hard to find then. I remember seeing them plentifully on a warm damp June day crawling on rushes, etc. The dead shells were always very abundant on the hills about half a mile from Sandown Castle ruins. If Mr. Halley still be doubtful about their identity, I could send him my specimens for inspection.—*Harry C. Leslie, Erith, Kent.*

HELIx CARTUSIANA.—Dr. Halley remarks in your last number that he has failed to find this shell near Deal. I have taken it myself on the hills behind Folkestone, and have received numerous specimens from Lewes. I think he will find it in both these localities, and in many others along the coast between those towns. While speaking of this shell I might add, that specimens I have collected in Italy are much larger and thinner than our English specimens.—*C. A.*

ZONITES GLABER (*Helix glabra* of Studer).—This land-shell, lately added to our fauna by Mr. Thomas Rogers, of Manchester, appears to be widely distributed. During this summer I found a very fine specimen in Saltram Wood, near Plymouth, and I have one in my collection which I found near Doncaster as far back as 1853, but which I then mistook for a large specimen of *Z. alliarius*. The latter specimen was submitted to Mr. Jeffreys, who pronounced it decidedly to be *Z. glaber*. If it turns up in other localities, I hope its capture will be recorded in your pages. At present the only places where it has occurred (so far as I know) are Manchester, Grasmere, Barmouth, Doncaster, and Plymouth.—*C. A.*



ACHATINA ACICULA.—What I take an interest in myself I always imagine others must also, and this must be my apology for intruding upon your time. In my garden I have occasionally met with living specimens of that pretty little shell, *Achatina acicula*, at the roots of herbaceous pæonies, *Iris fetidissima*, fol. var., and *Germanica*, *Lilium croceum* and *speciosum*. In some cases the plants were not quite healthy; would this, therefore, support the theory of their being carnivorous—as seeking parasitic grubs feeding on the roots? I had never found any specimens previously in Surrey, although in lists of the Messrs. G. S. and E. Saunders, of the London and Freshwater Mollusca found in the neighbourhood of Reigate, it is stated, “Some specimens found dead in an old wall near Reigate Heath.” In Dorsetshire I could generally procure living examples at the base and in the lamellæ of small rocks which crop out from the herbage on the Downs. At Bath, I remember, a large number (all dead) were once found in an ancient stone coffin, mixed with sandy debris, which had evidently been washed in by water percolating, and here finding a small reservoir.—*John E. Daniel, Epsom.*

BEE PROGENY.—Having recently read a new “Bee Book,” by Mr. Pettigrew, I was astonished to find that he held the doctrine that the working bees have the power of producing queen, worker, or drone, at pleasure, from *any egg*! I thought it was already thoroughly proved, and universally acknowledged, that the eggs, when laid, were of different sexes—that the power which the workers possess of changing a worker egg, or grub not more than three days old, into a queen, was only a process of development. A circumstance occurred in my apiary, during the year 1868, which, to my mind, proves that working bees have not the power of producing queens from drone eggs. On the 9th of March, 1868, I observed that a hive which ought to have been one of my strongest, had at its mouth a dead drone, not thoroughly developed. On the following day I found another; and on the 24th of April I observed a drone from this hive on the wing. The appearance of drones so unusually early for this part of the country excited grave suspicions on my part as to the capabilities of the queen. However, I allowed things to go on until the 5th of June, by which time the drones had increased in number, but the workers had dwindled to a few. In the middle of the day I drove the hive and removed the queen, which my note-book says was *very decrepit*. The hive contained drone brood only. To the bees (deprived of their queen) I gave a piece of worker comb, containing eggs, and brood in all stages, from a pure Ligurian stock. The bees only attempted to raise one queen. In this they were successful. She had the characteristic marks of the Ligurian, but was very small, and

turned out (much to my surprise) to be a drone breeder. She was not only smaller, but much more active than queens generally are during oviposition. On the 15th of July I removed a queen from a black stock of bees, and on the 23rd of the same month I destroyed every queen cell, giving it a piece of worker comb, containing eggs, and brood in all stages, from this drone breeder. The bees formed many queen cells on this comb, but every cell produced a drone. I opened some of the sealed queen cells, and satisfied myself that each contained a drone; others I allowed to hatch in due course, but not a single queen was produced.—*C. F. George.*

GREY PHALAROPE (*P. lobatus*).—A Sussex paper of the 12th Nov. reports the capture of two specimens of the Grey Phalarope in the neighbourhood of Littlehampton, in that county. Both birds were shot on ponds at some distance from the sea, having been probably driven inland by stress of weather.—*J. R.*

NATURE AS A BONE-SETTER.—Many readers of SCIENCE-GOSSIP would not know, perhaps, what to do for a small bird with a broken leg. Let me state two cases in which Nature did everything. On the 8th of March last a Cirl Bunting of mine broke what would generally be called the thigh-bone of its left leg. I presently bound it up as best I could, the shortness and fleshiness of the limb causing much difficulty in the operation. The bird was then put into a cage by itself, and soon succeeded in slipping off the bandage. A second bandage shared the same fate, and then we left the patient in the hands of Nature. The whole weight of the body was supported for about three weeks on the sound limb, the maimed one being closely drawn up in a natural sitting position, with the toes and claws all folded together. At the end of that time, however, the foot was allowed to press gently on the floor of the cage, or on the low perch which had been resorted to very soon after the accident; then the toes gradually opened, the perch was clasped, and at the end of a month the cure was effected. The second case was that of a Nuthatch which met with the very same fracture, through a moment's entanglement caused by fright at the sudden fall of a log in the aviary. The poor bird seemed so much alarmed, that I did nothing more than place food and water where he could get them most easily. For a day or so the leg drooped uncomfortably, but then it got into position, and the process of healing was precisely the same as in the former case, only about a week slower. On the 17th of September, the bone was broken, and at the end of October the bird was perfectly well; he now runs and flies about, and clings to the wires as if nothing had ever happened.—*T. S. Carte.*



## BOTANY.

MILTWAST.—In the November SCIENCE-GOSSIP "R. T., M.A.," asks what is the meaning of *Miltwast*. In Lyte's "Nievve Herball," published in 1578 (and doubtless in all the other old herbals, for I find that two or three hundred years ago authors copied from each other very much as they do now), are the following recipes, which tell us the meaning of the name.

"Hemionitis taken with vinegar doth open and helpe the hardnesse and stopping of the splene, and is a soueraigne medicine for the most part of acci-dentes, and greenes comming or proceeding from the rate or spleene."

"Lonchitis is very good against the hardnesse, stoppings, and swellings of the splene or melt when it is drunken, or layde upon with vinegar upon the place of the splene outwardly."

"The leaves of Ceterach taken with venegar by the space of fourtie dayes healeth the melt that is hard and stopt."

*Hemionitis* is *Scolopendrium vulgare*. Its English names were "Brode Spleneworte," or "Brode Miltwast," and Lyte restricts these names to the variety which has broad leaves with a cordate base. The ordinary form of the plant he calls "Stone Hartes-tongue," and he takes especial care to inform us that *this* "is not Hemionitis as some do think."

*Lonchitis* is *Blechnum boreale*; in "High Douch" "Miltzkraut;" in English "Great Spleeneworte."

*Ceterach* is *Ceterach officinarum*. Its English names were "Right Scolopendria," "Scale Ferne," "Finger Ferne," "Stone Ferne," "Ceterach," and "Myltewaste," in High Douch "Miltzkraut."

Thus the name Miltwast, or Miltwaste, or Mylte-waste (for our old authors were not very particular as to their spelling; and would, now and then, spell a word in half a dozen different ways in the same page), was given to these three plants, because they were supposed to be "very good" for *wasting*, or swageing away swellings and other diseases of the *milt* or spleen. Milt was the Anglo-Saxon name of the spleen, and that organ is called "the Melt" to the present day, here, and in many other country places. We gather also from the above extracts that the name "Miltwast" was not confined to *Ceterach officinarum*; in fact, it was most likely originally given to *Scolopendrium*, which appears to have been the original "Spleenwort," having, doubtless, been so named from its striking resemblance in outline to the milt of an animal, and for that reason supposed to be efficacious in diseases of that organ.—*Robert Holland*.

ERYNGION MULTIFOLIENSE.—The following, which I extracted from a good introductory treatise by W. Marsham Adams, entitled "Outlines of Geometry, or the Motion of a Point" (1869), conveys

a lesson as well adapted, it may be, for botanists as for geometers. "A fable runs, that an aged ass, seeing her little grandchild running towards her at a frantic pace, cried out, 'Whither so fast, my child? What do you tremble at?' 'O mother,' replied the poor little thing, breathlessly, 'I asked a great animal what a very tempting-looking plant was, and he said such dreadful words that I ran away as hard as I could go.' 'And what were the dreadful words he used?' '*Eryngion multifoliense*, or some such dreadful thing,' replied the little donkey, trembling. 'You are indeed an ass, my child,' replied the fond mother: 'he did but answer your question, and had you stayed to taste, you would have found those dreadful words meant a most delicious thistle.'"—*R. T., M.A.*

VICTORIA REGIA WATER-LILY.—This splendid plant blossomed in the gardens of Mr. Mayer, Bebington, near Birkenhead, last September. It grew in the open air, in a pond of warm water. This is said to be the first time that it has blossomed in Europe in the open air.—*A. J. M. A.*

## MICROSCOPY.

SCALE OF PRUSSIAN CARP (*Cyprinus Gibelio*).—The scale of Prussian Carp here figured should be compared with those of the Chub (fig. 100), the Crucian Carp (fig. 201) in the present volume, and of

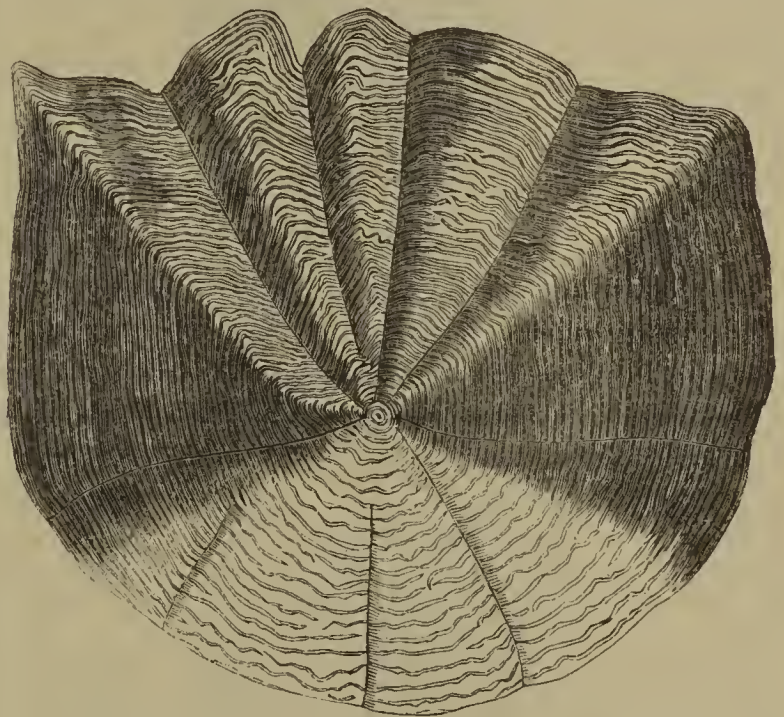


Fig. 221. Scale of Prussian Carp (*Cyprinus Gibelio*).

the Rudd and Roach on page 13 of our volume for 1869. We hope to continue figures of the scales of British freshwater fishes until at least the majority of them appear amongst our illustrations.

MOUNTED STARCHES.—Those who have been in the habit of mounting starches in glycerine or other fluid should look to their slides and compare them with recently mounted specimens of the same starches. We much fear that they will find the form of the starch granules to have undergone so



much change, especially if they have been long mounted, that they will be almost valueless for accurate determination." A communication on this subject appeared in the *Pharmaceutical Journal* of the 19th of November, to which we refer our readers.

SCALE OF SNIG EEL (*Anguilla mediorostris*).—The scale now figured should be compared with the scale of eel given in our last volume, on page 187. Although drawn nearly of the same size, the present is a smaller scale, rather more sigmoid than lozenge-shaped, rounded at the ends more than in the common eel, and the cells are spread over the surface, and *not* concentrically arranged in bands. The differences in these two scales are so distinct and interesting that both should be found in every cabinet. It is singular also that, as Mr. Crouch observes, "there are not known any certain external characters by which this eel may be definitely distinguished from others; it therefore becomes a ques-

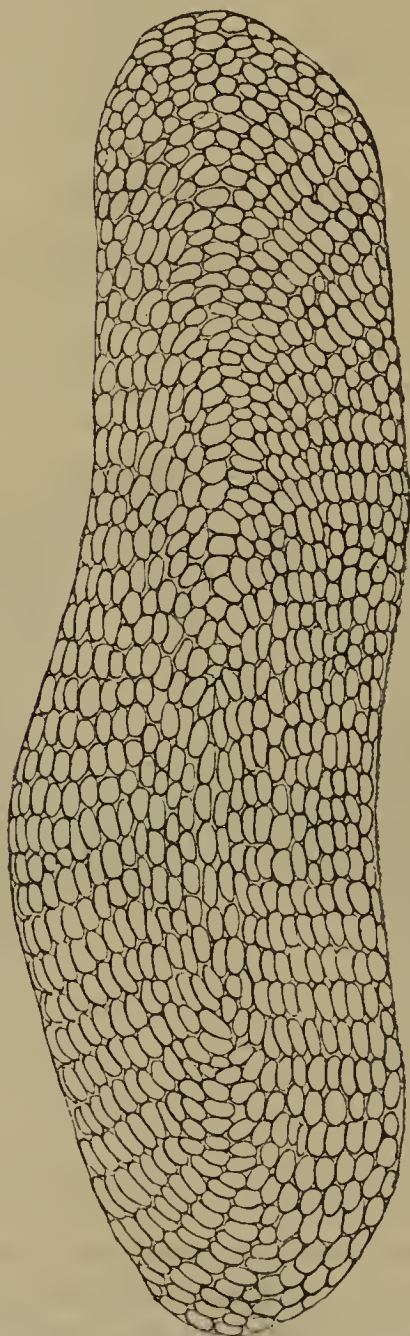


Fig. 222. Scale of Snig Eel (*Anguilla mediorostris*).

tion how far the difference between them in the processes of the vertebræ, and their entire absence in this species on the first five of these bones from the head, can be relied on as furnishing a sure and constant mark of its distinction from the others."

The species enumerated in "British Fishes" are:—

- Sharp-nosed Eel (*Anguilla acutirostris*).
- Dublin Eel (*Anguilla Hibernica*).
- Broad-nosed Eel (*Anguilla latirostris*).
- Snig Eel (*Anguilla mediorostris*).
- Grigg (*Anguilla* ?).

The last is an obscure species, or supposed species; but of the others we should be glad to receive portions of skin, with the scales *in situ*, of the Dublin Eel and the Broad-nosed Eel. The latter is common enough, and the former is found in the Liffey. When these scales are figured, we shall be able to judge whether the microscope cannot aid in separating the Snig Eel, as a distinct and good species, from the rest.

OPAQUE OBJECTS.—In the SCIENCE-GOSSIP of February, 1868, is suggested a way of mounting opaque objects in turned wooden cells with moveable covers; these cells are not very easily cemented on the slides, and are also clumsy in appearance. Since the above date I have been compelled to collect, from time to time, objects mounted in permanently-closed cells, and most of these are now, of course, nearly or quite spoiled. The fixed glass covers reduce the light slightly, injure greatly the definition, and almost invariably become incrustated on the under surface by a mass of crystallized or granular matter, which becoming with time more and more dense, ends in destroying the slide, by rendering the object practically invisible. The only explanation I can give of the persistence of object-preparers in using this form of mounting for dry opaque objects, is that purchasers see the objects when fresh mounted and clean; add them to their collections; exhibit them perhaps a few times, and *never look at them again*. I feel convinced that those microscopists who take the trouble to *examine the state of their opaque objects* will be inclined to protest against the intolerable nuisance of cemented glass covers. I have now, after many experiments, procured paper pill-box cells, made expressly for the purpose, which I think possess all the requisite qualities. They are inexpensive and neat; they can be cut down to any required depth; they are easily cemented on the glass slides with common paste; they will not fly off on a fall or sudden jar like the ordinary cells; and when properly adapted they will permit the object to be viewed with high powers and with every kind of illumination. These cells can be now obtained of the makers, Lynch and Co., 171 A, Aldersgate-street, and of Mr. C. Baker, the well-known optician of High Holborn.—*H. C. Richter, Kensington*.

[It has been suggested that these cells would be improved by the addition of a glass cover, and we are glad to learn that Mr. Baker proposes to make this improvement.—ED. S. G.]



## NOTES AND QUERIES.

**ECCREMOCARPUS.**—Any of your correspondents growing in their gardens that pretty but much neglected creeper *Eccremocarpus scaber*, will find that the bees gnaw a circular hole in the nectary, the contracted mouth of the long tube preventing their entry, and so rifle it of its sweets. This was noticed and commented on soon after the introduction of the plant, now nearly fifty years since. Paxton's Dictionary gives the year 1824 for its appearance in England.—*J. M. E. Daniel.*

**LIME DEPOSIT IN BOILERS.**—Could any of your correspondents give me any information as to whether water, in which potatoes have been boiled, would be of any avail in removing from a boiler the deposit left by water impregnated with lime; or if any solution would help to remove it?—*E. J. J.*

**THE WOODPECKER.**—A correspondent suggests that our provincial word *yaffel* applied to the Woodpecker, may be from the German word *Fordice*, given in Flügel as *Würfel*. I would suggest that it is a form of the common word *yapp*, "a snappish bark." Mr. Halliwell gives "yaff," to bark, so that the yaffel is the bird that barks; the bark being the sound dignified as "laughing in the sun:" a harsh laugh in fact.—*A. H.*

**CLIMATE PRODUCTS OF CALIFORNIA.**—I read under the above heading in SCIENCE-GOSSIP for November, page 160, a short extract from the *Gardener's Chronicle*, in which these words occur: "Apples do not do well here." Does this passage refer, as the heading would lead one to infer, to the whole State of California, or to some particular country, where the writer was located when he wrote it? I ask, because it is so much at variance with notes given me by a friend of mine, who was out in California for several years, and who spent a considerable portion of his time in travelling through the country for the especial purpose of inquiring into its agricultural and botanicaal resources. I have been looking over some of Mr. G. M.'s old note-books and a few reports published at Sacramento during his stay in the country. Perhaps it may interest the readers of SCIENCE-GOSSIP to see a few extracts. *Apropos* of apples I find, alluding to a fair, or exhibition which he attended in Marysville, nearly ten years ago, that he says, "The apples, all standard varieties, were large and fine. This and their freedom from any imperfection is a charming feature in Californian fruits." In another letter, when describing the region of the "Foot Hills," of the *Sierra Nevada*, he writes, "The soil and air here are peculiarly favourable to the cultivation of apple-trees, the fruit is very fine, far superior to that in the valley-land orchards." Again, giving me an account of a visit he paid a friend of his who had an estate called Laurel Wood Farm, on the west bank of the Guadaloupe River, he mentions one orchard containing sixteen thousand apple-trees. Surely people would not cultivate so extensively a tree that did "not do very well." The *Evergreen* hedges of California must be so attractive to English eyes when they first go over, and the native shrubs are magnificently beautiful. The Nutmeg-tree, so called because it bears a fruit like a nutmeg in shape; the Madeña, with pale red berries, and satin-like leaves; the Sugar Pine, the Yew, and the Spruce, are all fine trees. Then there are so many brilliantly-coloured flowers, many of them quite unknown to us in this country.

Others, which having been lately introduced, are still most rare here, all growing in wild luxuriance over there. I could fill some dozen pages with a description of the beautiful birds and fragrant blossoms of that

"Bright land of summery days and golden peace,  
Of vine and flower, and ever rich increase;"

Only as SCIENCE-GOSSIP is not entirely devoted to either ornithology or horticulture, my effusions would, even if the kindness of the editor gave them entrance, seem out of place in such a magazine.—*Helen E. Watney.*

**TOUCHEN-LEAVES**, p. 262.—In answer to Mr. Lees, I make the following short extract from Mr. Wise's "New Forest."—"The Tutsan (*Androsæmum*) is so common round Wootton that it is known to all the children as 'touchen-leaves,' evidently only a corruption of its name; and its berries are believed throughout the forest to be stained with the blood of the Danes." I may here state that Wootton is a village in the south-eastern part of the forest, not far from the inclosure of the same name.—*G. B. C.*

**DOES THE SQUIRREL SUCK BIRDS' EGGS?**—I have often heard it will do so, but on no occasion has the statement made me a believer in the story. During the past summer a person brought me a squirrel, and at the same time accused the creature of egg-sucking, but on close inquiry it seemed he had never seen them do so. A gamekeeper also assured me that the squirrel destroyed the eggs of the pheasant and partridge. I cannot, however, believe that the squirrel leaves the trees, where its natural food abounds, to search amongst the dead leaves and herbage for an egg diet. Often have I watched these lively and well-known little animals, but never observed them to touch eggs either in the trees or on the ground. Has any reader of SCIENCE-GOSSIP ever noticed anything of the sort? as it is a serious accusation to be brought against such an universal favourite; but as far as I can learn, the case is far from "proven."

**THE CUCKOO.**—I saw a specimen of this summer-loving bird on September 28th or 29th, evidently a young one; and last season I had a young one brought me—about the same date—which had been picked up dead. It is strange that most of the specimens of migrating species of birds which we see very late in the autumn are young ones, or at least birds of the year, and this fact has in one or two instances been given as motives of non-migration; but it is a conclusive proof that these late birds were unable to accompany their older and stronger relations to a more southern clime, and consequently proves the power of the migrating instinct, rather than being a proof that the species remain with us the winter through. I am well aware that the unequalled Gilbert White believed in a *partial* migration, especially of his favourite Hirundines; but in many cases, if not in all, I believe the severity of our winter kills those birds which are unable to quit our shores with the main body of migrants. In one of my entomological rambles last summer, I met a person who, knowing my love for the feathered tribe, asked me if I knew the history of the cuckoo, and what a *cruel* bird it was? and he gave me an anecdote, illustrating it, as follows—"An old cuckoo laid an egg in a wagtail's nest, which with the wagtail's eggs was duly hatched; the young cuckoo soon grew so large that it was obliged to turn out the proper inmates of



the nest, and, besides, the *quantity* of food brought was in a measure insufficient for his own capacious stomach; and that is not all," said he; "but when the cuckoo was able to fly, he *killed* the old wagtail and, *eating her, made off*, and nothing was left to tell the tale but a few feathers of the poor little murdered wagtail." My informant seemed to entertain a decided belief in the above statement, though he had not been the actual observer of such "murderous ingratitude," as he was pleased to term it.—*G. B. C. Ringwood.*

**DEATH-BOTTLE.**—Herewith I send you directions for making a death-bottle, from the pages of the *English Mechanic*. I find it very useful, even for killing moths; it acts so rapidly, that they have no time even to flutter enough to hurt themselves.—"Having chosen a large-mouthed stopped bottle of a size to suit, clean it well, then drop into it three or four good-sized lumps of potassic cyanide (half an ounce will be quite sufficient for a large bottle), cover completely with dry silver sand, and on the top pour a plaster made of plaster of Paris, mixed with about half its bulk of silver sand; pour a thickness of this from half to three-quarters of an inch. When set firm, cover over the surface of the plaster with a piece of loose blotting or filtering paper cut so as to nearly fit the bottle. This is a perfect death-bottle."—*A. S. C.*

**VULCANITE CELLS.**—Can any reader inform me, from experience, the best cement for attaching Messrs. Pumphrey's vulcanite cells to the glass slide? I cannot succeed with marine glue, probably owing to the glossy surface of the rings, and all cements are not to be trusted, as the preservative fluid may act upon them.—*R. H. M.*

**LIGURIAN BEES.**—Seeing Mr. McLure's request to know how the Ligurian bees have answered, I send an account of mine. I bought a large swarm on the 2nd June, 1869, which flourished and stood the winter well. A hive of black bees, close to them, perished. At the end of last April they became very populous, and on the 6th of May—the first sunny day we had had for some time, the wind N.W., and no drones having been observed—they sent out a large swarm,  $5\frac{1}{2}$  lb. weight, which was put into a Woodbury hive. On the 17th May they threw a good cast, as large as many ordinary swarms. After this, the parent hive (Neighbour's cottage) made 2 lb. of honey in glasses, and at the end of September weighed 25 lb. When the swarm was ten days old, my friend G. C. G. took out a large comb full of brood to make an artificial swarm. In spite of this drawback, the swarm increased rapidly, and filled a super and a half, giving me 25 lb. of beautiful white honey, and weighing, at the end of September,  $30\frac{1}{2}$  lb. The cast had also done very well, and would, I think, have filled some glasses; but I was induced to try the experiment of putting it on an empty hive, with large holes in the floor-board, for the bees to work downwards. The result was, the young bees dropped through the holes and could not find their way back, and died. Nevertheless, the hive is very full of bees, and weighed 22 lb. the end of September. I may mention that my neighbour's black bees have thrown scarcely any swarms, and have made very little honey. It has been considered here a bad year with bees. I gave my bees 2 lb. of food in March, although they had plenty of honey; and I consider it was of great use, making them breed earlier and swarm sooner. The Ligurian bees are

certainly much stronger than the black bees. I have seen one carry off a wasp. They keep their floor-board cleaner, and work more energetically; and, though very quiet and harmless *out* of their hive, they are very fierce *in* it, attacking those who take their honey unmercifully, their stings penetrating gloves, which the black bees cannot. Black bees have no chance against them, and I do not think would do in the same apiary. They increase much faster, and require larger hives. I consider them superior in every respect. My friend G. C. G., to whom he refers, I deeply regret to say, died a few weeks ago. I saw the artificial swarm he raised from the comb he took from my hive the beginning of last September. It was a populous hive, and he pointed out to me how many young Ligurians there were in it. I believe he added many black bees from other hives, to help to increase it in the first instance. I cannot say whether the queen is pure Ligurian or not. I should be very glad to know more about the sheet-iron covers Mr. McLure has invented, and the particulars of how they are made, if he will oblige me with a description of them.—*E. G. W.*

**LIGURIAN BEE.**—In answer to Mr. John McLure regarding the Italian, Alp, or Ligurian bee, I beg to state a few facts with regard to their history; and I do so with great pleasure, as I have been in the Ligurian bee districts, and know their good and bad qualities. This bee, as almost all bee-keepers are aware, was first sent into this country by Mr. H. C. Hermann, in 1859, and has been sold by all the bee agents for the last ten years, from a guinea to 10s. for each Ligurian queen. The competition, however, is not so great amongst the agents as in America, judging from the numerous notices in the "American Bee Journal," which is filled with the names of the sellers of bees and hives, with some amusing remarks from "Novice;" and I fancy English agents also write for the paper, as reference is made to the "pure strain" of Ligurian bees, just as the breeds of poultry are referred to in prize lists in England. This really beautifully-marked honey-bee, I think the Marquis de Spinola did not add to its reputation by calling it "The Ligurian bee." The *Ligures*, in ancient times, inhabited a country bordering on the Rhone, and subsequently spread over the whole extent of the district which is now called Piedmont, the country in which the marquis found the bees in 1805. According to Strabo, they were a different people from the Celts, and lived scattered through villages, and were celebrated as "*light-armed soldiers*." Cato stigmatizes them as "*lying and deceitful*;" other writers, however, such as Cicero and Virgil, speak highly of their *industry, courage, and perseverance*. If the bees, then, partake of the latter good qualities, it is well; but I fear, from reports in the Bee articles, they show more of the early disposition of the *Ligures*, and are "thievish," and "deceitful." They have been of great service to naturalists, however, as giving distinct markings from the common brown bee of England, by which the question of the ages of the queens, workers, and drones have been decided, instead of *resting on surmise only*.—*W. A. Mann, Churchill House, Dover.*

**BLACKHEART.**—The "Blackheart" mentioned by your correspondent, Mr. Edwin Lees, at p. 262, is *Vaccinium Myrtillus*, and the "touchen leaves" is the Tutsan, *Androsæmum officinale*, as you will see



by the subjoined extracts from Wise's "New Forest." "*The Blackheart*.—The bilberry (*Vaccinium Myrtillus*), the 'whim berry' of the northern counties, which grows very plentifully throughout the forest. It is so called by a singular corruption, the original word being hartberry, the old English *heorot-berg*, to which the qualifying adjective has been added, whilst the terminal substantive has been lost, and the first totally misapprehended. To go 'hearting' is a very common phrase. (See Proceedings of the Philological Society, vol. iii. pp. 154, 155)." (Page 280.)—"The Tutsan (*Androsæmum*) is so common round Wootton that it is known to all the children as 'touchen leaves,' evidently only a corruption of its name; and its berries are believed throughout the forest to be stained with the blood of the Danes." (Page 254.)—*Richard G. Keeley*.

HELIx CARthusIANA (p. 261).—A few years since some specimens of the above shell were given to me by a gentleman well versed in conchology; they were found near Bristol, and are exceedingly fine, being half as large again as the one figured in Sowerby's "Illustrated Index of British Shells."—*G. H. H.*

UNITED BRANCHES (p. 254).—I remember seeing, some years ago, in Studley Park, Yorkshire, a beech-tree having two branches forming a loop similar to that mentioned by L. Stammwitz. Near it was a small tree having two trunks, which united about two feet from the ground. Both peculiarities were, I believe, artificially produced whilst the wood was young by means of grafting.—*G. H. H.*

FOLKESTONE MUSEUM.—We are glad to hear that the Folkestone Natural History Society, which is already a flourishing body of one hundred and sixty members, has started a museum for local and type specimens of natural history. A room has been granted for the purpose by the corporation.

GOVERNMENT PATRONAGE OF SCIENCE.—Our astronomers have received an invitation which is as pleasing to them as men of science as it is painful to them as Englishmen. As our readers know, sixty-eight persons had volunteered to go to Spain and Sicily to view the total eclipse of December 22nd; our scientific societies had voted large sums of money for the equipment of the two observing parties; and every one was certain that Government would supply the means of transport; but every one was mistaken. The Admiralty discovered that the nation would assuredly disapprove if room were found for mere men of science and their trumpery in any of her Majesty's ships; and accordingly, just when the extensive preparations requisite for the expedition were in full progress, news came that the means of transport must be found by the observers themselves. We do not care here—we hardly have patience, indeed—to discuss the probable cause of a refusal so discreditable to the scientific repute of England. It had been announced by the Astronomer Royal (in connection with another matter) that Government would always be found liberal in scientific matters if a sufficient cause were shown by persons in whom they had trust; and we do not care to inquire whether the Astronomer Royal was mistaken in this matter, or whether the Government declined to put trust in him or in the Presidents of our Astronomical and Royal Societies; or whether, lastly, the sufficient cause was not brought before the Government with proper earnestness. Let the explanation be what it may, the fact remains—England has been

exhibited to all the nations as turning her back on science, and Englishmen of science have been discredited before the world as unworthy of England's confidence. But now news comes that the Government of the United States has not only found means of transport for two American parties, but has made the handsome grant of six thousand pounds to furnish suitable appliances for observing the eclipse. The American men of science have reached England. They recognise the pitiable condition to which our astronomers have been reduced by the Government, and they invite our sixty-eight volunteers to sail with them. A letter has been sent to these volunteers, inviting them, in the name of the American expeditionary parties, to accept this much-needed assistance. The offer is most generous; it is most inviting; it is one which no astronomer is justified in declining on account of sentimental considerations. But it certainly is a new and a painful position for an Englishman of science to be placed in, thus to find scientific alms offered him as a reparation for the insult he has, in effect, received from his own Government.—*Daily News, Nov. 5th.*

EGGS OF MOTHS, &c.—The illustrations of the eggs of butterflies, &c., are very interesting; and years ago I used to try and keep them as pretty objects, but found my trouble often of no use, from the birth of the caterpillars. It would add to the value of the paper on them if we were informed of the best way of preserving them, and also, on what plants to look for them, as it is not every one who has a work upon the subject, or knows them all by name.—*E. T. S.*

QUOTATION CORRECTED.—At page 224, No. 70 of SCIENCE-GOSSIP, your correspondent has incorrectly quoted Butler. Lines 547, 548, are:—

"He that complies against his will,  
Is of his own opinion still."

See Butler's "Hudibras."—*Thomas Ross.*

WHITE MOUSE.—A short time ago I caught a white variety of the common domestic mouse. The muzzle, ears, feet, and tail were of the ordinary "mouse" colour; the haunches silvery grey, and all the rest of the body pure white; the eyes jet black. It must be set down, I think, as a mere sport of nature. No white mice have been kept or seen inside the building (which is completely isolated) for years. I have been told of one or two similar occurrences.—*Henry Ulyett.*

GOLDFINCH.—Your correspondent's (J. R. Davies) informant is decidedly wrong in his remark about the colour of the legs of the Goldfinch. They are invariably black when taken from the field, but after moulting in a cage or aviary they become white. The difference in song arises from the county from which they are taken; for instance, those caught in Cambridgeshire are considered very good, and by the bird-fanciers much sought after; and with a certain fancy song, will realize as much as £2 each, while the Goldfinch of Surrey is thought but little of.—*Chas. J. W. Rudd.*

DEILEPHILA GALII AT STANLEY.—I have been successful in finding three caterpillars of *Deilephila Galii*, feeding on Yellow Ladies' Bedstraw, about a mile from this place. It is eleven years since this caterpillar was found in Perthshire.—*Thos. Marshall, Stanley, by Perth.*



## NOTICES TO CORRESPONDENTS.

JUVENIS.—Nothing is inserted in this journal unless accompanied by name and address of correspondent.

A. T. S.—Copy of proceedings of the Perthshire Society not received.

T. H. S.—The *Sectularia isabietina*, the shells are *Spirorbis nautiloides*, and the parasite is a species of *Tubulipora*.

W. P. (Canonbury).—Letter returned. Wrong address.

R. L.—Exposed furs are not so liable to be attacked by moth as when enclosed. Spirits of camphor, turpentine, and benzine are all recommended by their respective advocates.

B. H. K.—“Singing mice” are not at all uncommon.

J. R. P.—Was it a “centipede,” because some of these are luminous? “Wireworm” is rather vague, some wireworms are beetle larvæ.

M. S. W.—Will correspondents write their initials more distinctly and legibly, if they intend us to reply; we are often compelled to guess. The eggs are those of the earth mite (*Trombidium*), figured in an early number of this journal.

H. W.—The terms employed seem to be clearly enough defined in Tate's “Land and Fresh-water Molluscs,” published by R. Hardwicke, at six shillings (coloured).

J. H. S.—See notice at head of “Exchanges.” If we insert them gratuitously, we cannot write them out for the printer.

H. G.—Not sufficiently in our “line” for a second notice, however much your observations may meet with our approval.

C. E. H. R.—Similar reasons to those stated above in reply to H. G.

A. W. R. has found 33 whole grains of corn in the crop of a sparrow.

J. B.—We believe that your query about animals that move the upper jaw, is answered in an early volume of this journal.

D. W.—You had better consult Slack's “Pond Life.” The organisms written about are arranged in the months during which they are found.

H. D. (Liverpool).—It is a fungus, *Xylaria hypoxylon*.

REFER BACK.—Will correspondents, especially in reply to queries in “Notes and Queries,” quote the page on which the query occurs, and in remarks on previous observations it would be equally useful, and give but little trouble to each individual writer, but would entail considerable extra labour on the Editor.

F. C.—We cannot answer; you had better address your queries to the respective publishers.

A. C. (Liverpool).—Would any one believe that you, or any other person, could send slides through the post without box or similar protection? An attempt will be made next month to name the objects from the fragments. Of course Nos. 1 and 6 were broken, nothing else could be expected.

M. J. W.—Typical form of *Cystopteris fragilis*.

R. E.—The fly is *Musca domestica*.

H. M.—No. 1 is *Crisia denticulata*; No. 2 is *Bugula flabelata*.

A.—*Dicranella squarrosa*.—R. B.

R. G.—The early stage of *Discelium nudum*, the prothallium bearing plants of both sexes in flower.—R. B.

W. L. W. E.—*Hypnum riparium*.—R. B.

## EXCHANGES.

NOTICE.—Only one “Exchange” can be inserted at a time by the same individual. The maximum length (except for correspondents not residing in Great Britain) is three lines. Only objects of Natural History permitted. Notices must be legibly written, in full, as intended to be inserted.

A FRESH supply of Corallines and Marine Algæ for any objects of interest, especially microscopic fungi.—F. S., Post-office, Rugeley.

*Pyrola arenaria* (Koch), and other rare British plants, for rare British or foreign grasses.—J. H. L., 180, Mill Street, Liverpool.

*Helix revelata* given in exchange for *Succinea oblonga*, *Pisidium obtusale*, *Amphipeplea glutinosa*, or *Limnæa peregra*, var. *Burnetti*.—C. Ashford, Grove House, Tottenham, N.

*Liparis dispar*, eggs of, to be obtained by sending box and stamps to John Purdue, Ridgeway Plympton, Devon.

*Physcamitrium sphaericum* for *Tetraplodon angustatus* or *Eucalypta commutata*.—John Whitehead, 17, Shaw Street, Dukinfield, Cheshire.

WANTED to purchase or exchange *Pupa pusilla* and *Pupa substriata*, a few specimens of each.—Address, care of Major Mann, Church-Hill House, Dover.

FOSSILS from chalk for good entomological slides or wood sections, mounted.—Address, W. H. Gorum, Waltham Abbey, Essex.

FOR twelve varieties of micro-seeds send stamped envelope to Isaac Wheatley, Malling Street, Lewes. Any microscopic object acceptable.

WANTED, Silurian fossils in exchange for mountain limestone, gault, and oolitic fossils, and oblige, W. McLachlan, 2, Pavement, Clapham.

*Nycterine capensis* and *Eccremocarpus scaber*. For these choice seeds send other objects (seeds excepted) to C. D., 187, Oxford Street, Mile End, E.

FORAMINIFEROUS SAND AND SCALES OF PILCHARD AND SALMON PEEL. Stamped envelope and object to J. R. Pocklington, Woolcott Park, Bristol.

BRITISH SPECIMENS OF *Planorbis dilatatus* and *Zonites glaber*, for *Vertigo alpestris* and *Clausilia parvula*.—Thos. Rogers, 7, Cookson Street, Manchester.

SCALES OF RED AND GREY MULLET (unmounted).—Send stamped and addressed envelope (any object of interest acceptable), to G. E. Quick, Long Lane, Southwark.

FOR longitudinal section of boxwood, send stamped envelope and any object of interest, except seeds, to J. Sargent, jun., Fritchley, near Derby.

*Aregma gracile* (unmounted), for microscopic leaf fungi (unmounted), excepting *A. bulbosum*.—Dr. Graham, Holmwood, Weybridge.

BRITISH BIRDS' EGGS, nearly 80 varieties, in exchange for scientific instruments, books, or micro-slides.—E. L., Collegiate House, Wootton Bassett.

PALATE OF WHELK AND WINKLE (unmounted) in exchange for other Palates, or anything of interest.—R. H. Alderman, 14, Coal Exchange, E.C.

MICROSCOPIC OBJECTS, mounted and unmounted, chiefly from the Mediterranean and West Coast of Ireland, in exchange for other objects. Cutaneous plates from the skins of Holothuria would be very acceptable, mounted or in the skin.—R. William Battersby, Caragh Lake, Killarney.

POLYZOA (Corallines), &c., named (unmounted) for microscope, for mounted or unmounted objects. Send stamped envelope and objects to H. Munro, Lyme Regis, Dorset.

## BOOKS RECEIVED.

“The Dental Register.” Vol. XXIV. No. 9, Sept. 1870. Cincinnati.

“Catalogue of the Mollusca of Aberdeen, Banff, and Moray, and the Neighbouring Seas.” By Robert Dawson, M.A. Aberdeen, John Wilson.

“The Gardener's Magazine,” for November, 1870.

“Land and Water.” Nos. 250, 251, 252, 253.

“The Monthly Microscopical Journal.” November, 1870.

“The Animal World.” November, 1870.

“Elementary Treatise on Natural Philosophy.” By A. P. Deschanel, translated by J. D. Everett, M.A., D.C.L., &c. Part I.—Mechanics, Hydrostatics, and Pneumatics. Illustrated by 181 engravings on wood and one coloured plate. London, Blackie & Son.

“Crustacea podothalmata and the histology of their Shells.” By Edward Parfitt.

“Fossil sponge spicules in the green sand of Haldon and Blackdown.” By Edward Parfitt.

“Boston Journal of Chemistry.” Vol. V. No. 5.

“Birds of Norfolk.” By Henry Stevenson, F.L.S. Vol. 2. London, Van Voorst.

“Notes and Queries on China and Japan.” No. 6. Hong-kong.

“The American Naturalist,” for November, 1870.

COMMUNICATIONS RECEIVED.—J. E. T.—J. W.—E. T. S.—C. F. W.—R. H.—J. W.—H. C. L.—C. A.—A. S. C.—J. H. L.—A. H.—J. R. P.—J. F.—R. E.—J. C.—J. H.—M. S. W.—C. F. G.—G.—E. J. J.—J. H. G.—J. E. D.—C. A.—B. H. K.—H. E. W.—J. W.—C. E. H. R.—J. B.—W. H. G.—G. B. C.—J. S.—J. H. S.—R. H. M.—H. G.—G. E. Q.—T. R.—J. R. P.—E. G. W.—H. W.—H. C. R.—H. I.—I. L.—C. I. D.—W. A. M.—R. T., M.A.—J. P.—H. D.—R. G.—G. F.—T. S. C.—E. L.—A. R. G.—D. B. B.—R. G. K.—G. H. H.—C. J. W. R.—J. R.—H. U.—D. W.—W. McL.—A. T. S.—H. W. L.—A. E. B.—R. S. H.—R. H. A.—J. J. W.—W. E. H.—R. W. B.—J. A. H.—W. L. W. E.—F. C.—H. M.—J. B.



# INDEX TO VOL. VI.

- ABILITY OF AQUATIC INSECTS TO SUSTAIN SEVERE COLD, 41.  
 Abnormal Plantain, 37.  
 About the Elm-tree, 77.  
 A brief Gossip about Bees, 269.  
 Abstinence of Insects, 64.  
 Accidental Variations of Seed-leaves, 145, 226.  
*Aceras anthropophora*, 189, 211.  
*Achatina uicula*, 278.  
*Achyla prolifera*, 23.  
 Adaptation of Microscope, 20.  
*Adiantum capillus-Veneris*, 67.  
*Adiantum reniforme*, 71.  
 Admiral or Admirable, 21, 70.  
*Æschynanthus* in Fruit, 95.  
 Affection in Birds, 65.  
 Affection of Insects for their Young, 64.  
 Agarics, British, 139.  
 Age of the Salmon, 233.  
 A Ghost Story, 94.  
*Agrophila sulphuralis*, 184.  
 Albatross, 209.  
 Alchemy superseded, 235.  
 Algeria, Locusts in, 259.  
 Alpine Bees, 257.  
 "American Entomologist," 90.  
 "American Naturalist," 79.  
*Amherstia*, 188, 215.  
 Amplification, Microscopic, 187, 230.  
*Anas crecca*, 35, 66.  
*Andromeda polifolia* in Ireland, 186.  
 "Animal World, the," 22.  
 Animated Oats, 190, 211, 212, 237.  
 Anomalies of Speech, 165.  
*Anomodon attenuatus*, 83.  
*Anser gambensis*, 51.  
 Anther Smut, 160.  
 Antipathies, Floral, 70.  
 Antique, Studies from the, 14, 45, 71.  
 Ant-lion, the, 87.  
 Ants, 241.  
 Ants, Death to, 263.  
 Ants, White, 185, 263.  
 Aphides, Killing, 141.  
 Aphides, Winged, 249.  
*Apium graveolens*, poisonous, 139.  
*Aplysia*, New Species of, 113.  
*Aplysia punctata*, 185.  
 Apterous Insects, 49, 105, 126, 164.  
 Aquarium Difficulty, 142, 165, 191, 215, 216.  
 Aquarium, Marine, 121, 179.  
 Aquarium Query, 261.  
 Aquarium, the Brighton, 40.  
 Aquarium Worms, 238.  
 A Rat's Ride, 90.  
*Arbutus Unedo*, 166, 276.  
*Ardea stellaris*, 95, 137.  
*Arges Cyclopus*, 25.  
*Argynis Lathonia*, 233, 258.  
*Armadillo vulgaris*, 41.  
 Artificial Swarming, 188.  
*Arum maculatum*, 73.  
*Arum maculatum* and Rooks, 166.  
*Arundo phragmites*, 19, 94.  
*Asperula odorata*, 47.  
*Asplenium Ruta-muraria*, 215.  
*Assimineu Grayana*, 259.  
 Asterias, 150.  
 A Suggestion, 71.  
 At Table, 191.  
 Attractive Plant, 209.  
 Attractive Power of Female Moths, 153, 174, 213.  
 Aviary, Birds for an, 113, 159.  
 BADGERS, 95.  
 Badger and Otter, 54.  
*Ballota nigra*, 47.  
 Bark of the Elm, 71.  
 Barley, a Field of, grown from Oats, 164.  
*Bartsia Odontites*, 210.  
 Bearded Titmouse, the, 65.  
 Bee Book, 118.  
 Bee Orchis, 239.  
 Bee, Parasites of the Honey, 1, 42.  
 Bee Progeny, 278.  
 Bees, a brief gossip about, 269.  
 Bees aloft, 70.  
 Bees, Artificial Swarming of, 188.  
 Bees as Botanists, 47, 188, 212, 213, 215, 232, 236, 237.  
 Bees Boring, 65, 117, 142, 165, 190.  
 Bees, Deserting, 21, 42.  
 Bees devoured by Birds and Toads, 117, 141, 142, 161, 164, 166.  
 Bees, Italian, Alp, or Ligurian, 257.  
 Bees, Ligurian, 21, 24, 34.  
 Bees, Queries about, 119, 141, 142, 167, 188, 212, 213, 215.  
 Bees, Sagacity in, 65, 117.  
 Bees, Strange, 141, 143, 161.  
 Beet, the Sea, 100.  
 Beetles, Light-giving, 112.  
 Beetles, Mummied, 113.  
 Beetles, Scavenger, 143.  
 Beetles, Swarm of, 233, 263.  
*Bellis perennis*, 67.  
 Berberry, the, 190.  
*Beta maritima*, 100.  
 Bibliography of Saprolegniaceæ, 67.  
 Bird Notes, 184.  
 Bird Parasites, Eggs of, 132.  
 Birds, Affection in, 65.  
 Birds, Book of, 54.  
 Birds, British, 13, 35, 58, 108, 157, 179.  
 Birds, Death of Native, in New Zealand, 86.  
 Birds for an Aviary, 113, 159.  
 "Birds of Norfolk," 276.  
 Birds of Paradise, 246.  
 Bittern in Norfolk, 95, 137.  
 Blackheart, 262, 282.  
 Black Horehound, 47.  
 Black v. Ligurian Bees, 34.  
 Bleak, Scales of the, 187.  
 Blindness, Natural, 182.  
 Bog-plants, Isle of Wight, 210, 234.  
 Bone-setter, Nature as a, 278.  
 Book of Birds, 84.  
 Book of Nature and the Book of Man, 102.  
 Books, New, 101.  
 Borago, 165, 189, 212, 213, 214, 239.  
 Botanical Analysis, 186.  
 Botanical Synonymy, 95.  
 Botany, Journal of, 44.  
 Branches, Three-leaved, 250.  
 Branches, United, 254, 283.  
 Bred Specimens of Insects in Collections, 251.  
 Brighton Aquarium, 40.  
 Bristol, St. Mary Redcliff, 23.  
 British Agarics, 139.  
 British Birds, 13, 35, 58, 108, 157, 179.  
 British Fishes, Couch's, 137.  
 British Fungi, 77.  
 British Fungi, Handbook of, 211.  
 British Insects, List of, 137.  
 British Shells, New, 130, 138, 161, 277.  
 British Sponges, Common, 172.  
 Brown-tail Moth, the, 263.  
 Buckland's Geology, 22.  
 Buff-tip Moth, the, 236.  
 Bugs, Water, 188.  
 Burgeoning, 45, 69, 72.  
 Butterbur, the fragrant, 67.  
 Butterflies at Sap, 22.  
 Butterflies, Eggs of, 251, 283.  
 Butterfly, who'd be a, 143.  
 Buxbaum's Speedwell, 43, 91, 186.  
 CALABAR BEAN, STARCH OF, 68.  
 California, Climate products of, 260, 281.  
 Camberwell Beauty, 209.  
*Campanula rotundifolia*, 44.  
 Cannibal, a, 119.  
 Capture of an Otter, 114.  
 Carp, Scales of the, 235, 279.  
 Carrier Pigeon, 184.  
 Caterpillar Nurture, 149.  
 Caterpillar of Emperor Moth, 239.  
 Caterpillars at Work, 47, 70.  
 Cat, Ferocity of the Wild, 63.  
 Cats, 17, 23.  
 Cats and Figs, 16.  
*Catus ferus*, 63.  
 Cause or Effect? 46, 71.  
 Cells, Vulcanite, 20.  
 Centenine Eggs, 114.  
*Cerura vinula*, 105, 124.  
 Chalk Foraminifera, 81, 106, 155.  
 Chalk Foraminifera, to clean, 167, 214.  
*Charadrius pluvialis*, 58, 95, 114, 188.  
 Cheap Foreign Objectives, 20.  
 Chelifers, 114.  
*Chenopodium Bonus Henricus*, 189, 214, 234, 238.  
 Chestnut-trees, Spiral Twist in, 237.  
 Chinese method of catching Eels, 213.  
 Chinese Mummy, 123.  
 Chinese Silkworm, Wild, 134.  
 Cholera Flies, 249.  
 Christmas Primroses, 45.  
*Chrysopa perla*, 231, 237, 239.  
 Chub, Scales of, 92.  
*Cicada*, 41.  
 Cleaning Shells, 190, 214.  
 Clifton College Museum, 237.  
 Climate products of California, 260, 281.  
 Cold, Insects able to sustain severe, 41.  
 Cole Titmouse, the, 42.  
 Colour in Eggs, 238.  
 Colour in Frogs, 233.  
 Colours of Flowers, 45.  
 Colour of Insects affected by Hibernation, 76.  
 Colours of Insects dependent on their Food, 247.  
*Colymbus arcticus*, 83.  
 Common British Sponges, 172.  
 Compositæ, Cross Fertilization of, 30.  
 Confervæ in Aquaria, 142, 165, 191, 215.  
 Conifers, Stigmas (?) of, 142.  
 Cornwall, Flora of, 47, 50.  
 Corrected Quotation, 283.  
 Cowper and the Nightingale, 142, 175, 209.  
 Cowslips, 141, 164, 166, 190.  
 Cranesbills, 22.  
 Cricket, the Mole, 41.  
*Crithmum maritimum*, 263.  
 Cross Fertilization of Compositæ, 30.  
 Croydon Microscopical Club, 116.  
 Crustaceans, Pigmy, 26.  
 Crustacea, to Preserve, 21.  
 Crystals for Polariscope, 92.



Crystals in Wasp, 45, 70, 71.  
Crystals, Spiral, 47.  
Cuckoo-pint as a Microscopical Object, 116.  
Cuckoo, the, 108, 138, 281.  
*Cuculus canorus*, 108, 138, 281.  
Cultivation of Mushrooms from Spawn, 79.  
Curious Bodies, 238.  
Curious form of Common Reed, 19.  
Curlew, the, 179.  
Cuttle-fish Bone, 177.  
*Cytisus Adami*, 186.

DABCHICK, 119.  
Daisy, Cross Fertilization of the, 39.  
Daisy, the, 67.  
Dark Arches Moth, 32.  
Death-bottle, 282.  
Death of Native Birds in New Zealand, 86.  
Death's Head Hawk-moth, 114, 161.  
Death's Head in a Bee-hive, 143.  
Death to Ants, 263.  
*Deilephila Galii*, 209, 229, 233, 283.  
*Deilephila Livornica* at Brighton, &c., 161, 229, 232, 233.  
Deposit of Lime in Boilers, 281.  
Derivation of Foxglove, 43, 67, 69, 91, 93, 115, 118, 135, 166.  
Deserting, Bees, 21, 42.  
Diatom Markings, 178.  
Diatoms, 22, 37, 55, 61, 140, 178, 235.  
Diatoms from Guano, 55.  
Diatoms, New, 61.  
Diatoms, Note on, 140.  
Diatoms to the Rescue, 22, 37.  
Diffuence of Kolpods, 185.  
Dimorphism in Plants, 221.  
Dinornis, the, 65.  
Dissectors, Hints for, 103.  
Diver in Yorkshire, 83.  
Dobbin and Pegasus, 54, 93.  
Dodder, the, 117, 118, 120.  
Do Insects feel Pain? 224, 255.  
D'Orbigny's Foraminifera, 81, 106, 155.  
Double Brood, 191.  
Dragon-fly in Town, 237, 262.  
Dun Cow, Ribs of the, 23, 38, 63, 69, 94, 96.

EARLY MOTHS, 138.  
East London Naturalists' Society, 211.  
*Eccremocarpus*, 281.  
*Echini*, 150.  
Eel, Scale of the Snig, 280.  
Eels, how the Chinese catch, 213.  
Effect, Cause or, 46, 71.  
Eggs, Centenine, 114.  
Eggs, Large, 114.  
Egg, Small, 212, 259.  
Eggs, Notice! 185.  
Eggs of Bird Parasites, 132.  
Eggs of Butterflies and Moths, 251, 283.  
Eggs of Insects, Mounting, 92, 283.  
Egg Vitality, 191.  
Elm as a Microscopic Object, 116.  
Elm Bark, 71, 83.  
Elm-tree, about the, 77, 102, 215.  
Embryogeny of Insects, 58.  
Embryo Oysters, 119.  
Embryos, Tricotyledonous, 115, 139, 145, 226.  
Emigration of Otters, 90.  
*Emmelesia affinitata*, 68, 113.  
Emperor Moth, Caterpillar of, 239.  
Enclosed Nest and Eggs, 114.  
English Plant-Names, 127, 210, 211, 227, 234.  
Entomological Society, 192.  
Entomologist's Paradise, 277.  
Era, a New, in Microscopy, 7.  
*Erinaceus Europæus*, 273.  
Errors of the Press, 254.  
*Eryngion multifoliense*, 279.  
Event of the Month, 162.

FEMALE MOTHS, ATTRACTIVE POWER OF, 153, 174, 213.  
Fern Starch, 235.  
Fertilization of Compositæ, 30.  
Field Clubs, to Secretaries of, 47.

Fieldfare, the, 13, 141.  
Figs, Cats eating, 16.  
Fingers and Toes, 269.  
Fire, 143.  
Fireflies, 41, 70, 117.  
Firefly, Spectrum of the, 117.  
Fishes, Couch's British, 137.  
Fish, Musical, 57, 87, 95, 97, 146.  
Fish, Ordnance and, 213, 259.  
Fish, Scales of, 92, 140, 187, 235, 279, 280.  
Fish, the Volcano, 25.  
Fleas, Singular Emergence of, 259.  
Flies in Liquor, 273.  
Flies, Smother and Cholera, 249.  
Flies, Something like a Swarm of, 65.  
Flint, Foraminifera in, 68.  
Flock of Missel Thrushes, 259.  
*Flora Hantoniensis*, 166, 212, 261.  
Flora of Cornwall, 47, 50.  
Flora of Italy, 115.  
Floral Antipathies, 70.  
Floral Findings, 6, 46, 53, 70, 88, 202.  
*Floscularia campanulata*, 191.  
Flowers, Colours of, 45.  
Flying Spider, 237.  
Folkestone Museum, 283.  
Folkestone, Natural History of, 65.  
Food, Insects as, 66.  
Food of Insects, 41.  
Food of the Snipe, 42.  
Foraminifera, 9, 68, 81, 106, 155, 167, 209.  
Foraminifera, Chalk, 81, 106, 155.  
Foraminifera in Flint, 68.  
Foraminifera, recent, 9.  
Foraminifera, to clean, 167.  
Forces of the Universe, 258.  
Fossils, Preservation of, 23.  
Fowls, 189.  
Foxglove, 43, 67, 69, 91, 93, 115, 118, 135, 166, 260.  
Fragrant Butterbur, the, 67.  
Fresh-water valved Vaginicola, 33.  
Frogs, Colour in, 233.  
Frog, the, 71, 119, 191, 233.  
Fuel of the Sun, 101.  
Fungi, British, 77.  
Fungi, Handbook of British, 211.  
*Fusus contrarius*, 261.

*Gallinago major*, 65.  
Gangetic Porpoise, 90.  
Gardener's Chronicle, new series, 47.  
Garden Oracle for 1870, 46.  
Geology, Dean Buckland's, 22.  
Geology, Popular, 38.  
Ghost Story, a, 94.  
Gigantic Ribs, 63.  
Gipsy Moth, the, 32, 71.  
Glass, Transparent Painting on, 213.  
Glowworm, Light of the, 69.  
Goat-moth, Larvæ of, 65.  
Golden Oriole, the, 138.  
Golden Plover, the, 58, 95.  
Goldfinches, 261, 283.  
Good King Harry, 189, 214, 234, 238.  
Goose, Spur-winged, in Wiltshire, 51, 95.  
Government Patronage of Science, 283.  
Granite, Story of a Piece of, 169.  
Greater Spotted Woodpecker, 184.  
Great Shrike, the, 209.  
Grey Phalarope, 278.  
*Grimmia Ungerii*, 275.  
*Gryllotalpa vulgaris*, 41.  
Guano, Diatoms from, 55.  
Guest, an unwelcome, 141.  
Gulls inland, 138.

HABERGEON, 94, 118.  
Hairs of Maurandya, 235.  
Hairs of Sundew, 111, 212.  
Hairs of Tillandsia, 116.  
Hampshire Flora, 166.  
Handbook of British Fungi, 211.  
Harebelle, 118.  
Hares and Rabbits, Hybrids between, 262.  
Harvest Bumps, 236, 261.  
Hasan-i-Yusaf, 176.  
Hawfinch's Nest, 161.  
Hawk-moths, 114, 161, 209, 229, 232, 233, 283.  
Hedgehog, the Common, 273.  
*Helix Cartusiana*, 261, 268, 277, 283.

*Helix nemoralis*, 215, 234, 238.  
Herb Paris, 164, 210.  
Herbs, 260.  
Herring Gull, the, 157.  
Herring, the, 41.  
Hints for Dissectors, 103.  
Hints on preserving Larvæ, 51.  
History and Traditions of the Lotus, 124, 208, 231, 272.  
"Hoddy-doddy," 21, 70, 93, 94, 212.  
Holly Berries in July, &c., 186, 210, 213, 234.  
*Holothuria*, 137.  
Horehound, the Black, 47.  
Hornet's Tongue, 163.  
Horsetail Sports, 167.  
Humble Bee's Nest, odd place for, 21.  
Humming Bird Hawk-moth, 41.  
Hybernation, Colour of Insects affected by, 76.  
Hybernation of *Hydrocharis*, 271.  
Hybrids between Hares and Rabbits, 262.  
*Hydrocharis*, Hybernation of, 271.  
*Hylurgus juniperda*, 42.

IGUANA, a Snake-killing, 166.  
Improved Turntable, 163.  
Indian Corn, 43.  
Insect Embryogeny, 58.  
Insects, Ability of, to sustain Severe Cold, 41.  
Insects, Abstinence of, 64.  
Insects, Affection of, for their Young, 64.  
Insects, a Guide to the Study of, 102.  
Insects as Food, 66.  
Insects, Brain of, 262.  
Insects, Bred Specimens in Collections of, 258.  
Insects, Colour of, affected by Hybernation, 76.  
Insects' Colours dependent on their Food, 247.  
Insects, do they feel Pain? 224, 255.  
Insects, Food of, 41.  
Insects, List of British, 137.  
Insects, Mounting Eggs of, 92.  
Insects, Musical, 133, 236.  
Insects on Snow, 262.  
Insects, Plants attractive to, 8.  
Insects, Reunion of severed, 118.  
Insects, Sounds produced by, 64.  
Insects, Wingless, 49, 105, 126, 164.  
Introductions, New, 248.  
Ireland, *Andromeda polifolia* in, 186.  
Irregular Primroses, 139, 162.  
Is it a Bee? 142.  
Isthmus of Panama, 262.  
Italian Bees, 257.  
Italy, Flora of, 115.  
Ivy-leaved Toadflax, 43, 71.

JALAP, TAMPICO, 142.  
Journal of Botany, 44.  
July, Holly Berries in, 186, 210, 213, 234.  
Jutland Deposit, 235.

KILLING APHIDES, 141.  
Killing is Murder, 270.  
Killing no Murder, 224.  
Kingfisher, a rash, 277.  
Kolpods, Diffuence of, 185.

LACEWING FLY, 237, 239.  
Lacewing Fly, Food of the Larva of the, 231.  
*Lanius excubitor*, &c., 209.  
*Larus argentatus*, 157.  
Larva of Goat-moth, 65.  
Larva of Privet Hawk-moth, 90.  
Larvæ, Hints on preserving, 51.  
Larvæ, Rare, 39.  
Laurel Berries for destroying Thrips, 17.  
Leaves, Variation in, 214.  
Lepidoptera, Plumules of, 20.  
Leporids, 262.  
*Leuciscus alburnus*, 187.  
Lichens, 115.  
Lichens, a Handy-book of, 47.  
Light-giving Beetles, 112.  
Light of the Glowworm, 69.  
Ligurian Bees, 21, 24, 34, 257, 282.



Lime-deposit in Boilers, 281.  
 Limestone, the Story of a Piece of, 217.  
*Limnanthes Douglasii*, 210.  
*Linnea peregra*, 137.  
*Linaria cymbalaria*, 43, 71.  
*Liparis dispar*, 32, 71.  
 Local Names of Plants, 227, 234, 262.  
 Local Transactions, 208.  
 Locusts at Sea, 175.  
 Locusts in Algeria, 259.  
 Locust-tree, the, 271.  
 Long-tailed Titmouse, 17.  
 Look to your Plants! 47, 70.  
 Loose-strife, 237.  
 Lords-and-Ladies, 73.  
 Lotus, its History and Traditions, 124, 208, 231, 272.  
 Louis d'Or, 188.  
*Lytta vesicatoria*, 65.  
  
*Macroglossa stellatarum*, 41.  
*Macrothrix*, 204.  
 Maize, 43.  
 Malvern Field Club, 160.  
 Manipulation, Microscopical, 20, 187.  
 Maoris, Petrified, 18.  
 Marine Aquarium, 121, 179.  
 Markings of Diatoms, 178.  
 Marsh Titmouse, 18.  
 Martin, Winter, 270.  
 Maurandya, Hairs of, 235.  
 Mergansers, 95, 110.  
*Mergus albellus*, 95, 110, 137.  
*Mergus Merganser*, 96, 110.  
 Microscope, Adaptation of, 20.  
 Microscopic Amplification, 187, 230.  
 Microscopic Objects, 116.  
 Microscopical Manipulation, 20.  
 Microscopy, a new Era in, 7.  
 Midnight Sky, the, 57.  
 Miltwast, 263, 279.  
 Miniature Photographic Apparatus, 212.  
 Misleading Localities, 214.  
 Missel Thrushes, Flock of, 259.  
*Modiola barbata*, 90.  
 Mole-Cricket, the, 41.  
 Mollusc on Shore, 64.  
 Mollyhawk, 190, 209, 212.  
 Month, Event of the, 162.  
 Monthly Microscopical Journal, 20.  
 Mosquitoes, 167, 168.  
 Mosses, New, 83, 275.  
 Mosses of Sussex, 139.  
 Moth "Sembling," 153, 174, 213.  
 Moths, attractive power of Female, 153, 174, 213.  
 Moths, Early, 138.  
 Moths, Eggs of, 251, 283.  
 Mounted Starches, 279.  
 Mounting Insects' Eggs, 92.  
 Mouse, White, 283.  
 Mummied Beetles, 113.  
 Mummy, the Natural Chinese, 123.  
 Murrel, 188.  
 Muscular Motion, 68.  
 Museum of Clifton College, 237.  
 Mushrooms, Cultivation of, from Spawn, 79.  
 Music Shells, 188, 215.  
 Musical Fish, 57, 87, 95, 97, 146.  
 Musical Insects, 133, 236.  
 Mutation of Species, 162.  
*Myrmeleon formicarius*, 87.  
 My Tank, 68.

NACHET'S ADDRESS, 48.  
 Name, a Curious, 19.  
 Names of Plants, 127, 210, 211, 227, 234, 262.  
 Natural Blindness, 182.  
 Natural Chinese Mummy, 123.  
 Natural History of Folkestone, 65.  
 Natural History, Study of, 112.  
 Naturalists' Society, the East London, 211.  
 Nature as a Bone-setter, 278.  
 Nature never to be surprised, 5.  
 Nepenthes, Pitcher of, 128.  
 Nest and Eggs, enclosed, 114.  
 Nesting of the Teal, 66.  
 Nest of Hawfinch, 161.  
 Net, the Towing, 193.  
 New Books, 101.  
 New British Shells, 130, 138, 161, 277.

New Diatoms, 61.  
 New Era in Microscopy, 7.  
 New Food for Silkworms, 18.  
 New Introductions, 248.  
 New Mosses, 83, 275.  
 New Zealand, Death of Native Birds in, 86.  
 Nightingales, 142, 175, 209.  
*Nitophyllum versicolor*, 127.  
 Norfolk, Birds of, 276.  
 Norfolk, Bittern in, 95, 137.  
 Norfolk, Richard's Pipit in, 17.  
 Note on Diatoms, 140.  
 Notes of Birds, 184.  
*Numenius arquata*, 179.  
 Nurture of Caterpillars, 148.

OATS, A FIELD OF BARLEY GROWN FROM, 164.  
 Oats, Animated, 190, 211, 212, 237.  
 Objectives, Cheap Foreign, 20.  
 Objects, unmounted, 216.  
 Odd Place for Humble Bee's Nest, 21.  
 Olney, *Silybum Marianum* near, 186.  
 Opaque Objects, 280.  
*Orchis hircina*, 45.  
 Ordnance and Fish, 213, 259.  
*Oriolus galbula*, 138.  
 Otter and Badger, 54.  
 Otter in Oxfordshire, 21.  
 Otters, 21, 54, 90, 113, 114, 137, 138, 209.  
 Otters, Emigration of, 90.  
 Oviparous or Viviparous, 70.  
 Oysters, Embryo, 119.  
 Oysters, Young, how to Prepare for the Microscope, 140.  
 Oxfordshire, the Otter in, 21.

PAIGLE, 141, 164, 190.  
 Pain, Do Insects feel it? 224, 255.  
*Pallene*, 26, 66.  
 Panama, Isthmus of, 263.  
 Pas d'Arco, 188, 214, 238.  
 Paradise of Entomologists, 277.  
 Parasite of the Sandfly, 99.  
 Parasites of Birds, Eggs of, 132.  
 Parasites of the Honey Bee, 1, 42.  
 Paris, the Herb, 164, 210.  
*Parus ater*, 42.  
*Parus biarmichus*, 65, 95.  
*Parus caudatus*, 17.  
*Parus cristatus*, 117.  
*Parus palustris*, 18.  
 Pencil-tails, 187, 209.  
 Pennyroyal, 118.  
 Perfumes, 47.  
*Petasites fragrans*, 67.  
 Petrified Maoris, 18.  
*Phacelia tenuetifolia*, 167, 189, 211.  
 Phalarope, Grey, 278.  
 Phosphorescence, 212.  
 Photographic Apparatus for Tourists, 212.  
*Phragmites communis*, 44.  
*Picus major*, 184.  
 Pigeon, the Carrier, 184.  
 Pigmy Crustaceans, 26.  
 Pine-beetle, the, 42.  
 Pipit in Norfolk, 17.  
 Pitcher-plant, the, 128.  
*Plantago coronopus*, 37.  
 Plantain, abnormal, 37.  
 Plant Names, 127, 210, 211, 227, 234, 262.  
 Plants attractive to Insects, 8.  
 Plants, Dimorphism in, 221.  
*Plectrophanes nivalis*, 71, 90, 114.  
 Plover, the Golden, 58, 95, 114, 188.  
*Plumatella repens*, 228, 274.  
 Plumules of Lepidoptera, 20.  
 Podder, 91, 117, 118, 120.  
 Polariscope, Crystals for, 92.  
 Pollen, on, 52, 116.  
*Polyzenus lagurus*, 187, 209.  
 Popular Geology, 38.  
 Porpoise, Gangetic, 90.  
*Portesia auriflua*, 263.  
 Post Oaks, 188.  
 Potatoes, 21, 45.  
*Potentilla fruticosa*, 19.  
 Prairie Fires, 263.  
 Pre-historic Remains, 165.  
 Preservation of Crustacea, 21.  
 Preservation of Fossils, 23.  
 Preserving Larvæ, Hints on, 51.

Preserving Wood, 164.  
 Press, Errors of the, 254.  
 Priekmadam, 70, 93, 94.  
 Primroses, Christmas, 45.  
 Primroses, Irregular, 139, 162.  
*Primula farinosa*, 100, 142.  
 Privet Hawk-moth, Larva of, 90.  
 Pseudogonidia, 20.  
 Puppy Propensities, 65.  
 Puss-moth, the, 105, 124.  
 Pyenogons, 26, 66.  
 Pygidium of Lacewing Fly, 231, 237, 239.  
*Pyrola media*, 47, 91.  
 Pythons, Birth of young, 64, 95.

QUAIL CALL, THE, 189.  
 Quail's Eggs, 232.  
 Quail's Nest near Leeds, 209, 238.  
 Quaint Name, 19.  
 Queen of Spain Fritillary, the, 233, 258.  
 Quekett Club, Soirée of, 92.  
 Quekett Microscopical Club, 126, 148.  
 Queries about Bees, 119, 141, 142, 167, 188, 212, 213, 215.  
 Quotation corrected, 283.

RABBITS AND HARES, HYBRIDS BETWEEN, 263.  
 Raphides and Sphæraphides, 92.  
 Rare Larvæ, 39.  
 Rare Moths at Weston-super-Mare, 229.  
 Rare Plants at Torquay, 43, 139, 165.  
 Rash Kingfisher, a, 277.  
 Rat's Ride, a, 90.  
 Rats, Sagacity of, 66.  
 Recent Foraminifera, 9.  
 Reed, curious Form of, 19.  
 Reunion of severed Insects, 118.  
 Rhododendron Scales, 68.  
 Ribs, Gigantic, 63.  
 Ribs of "the Dun Cow," 23, 38, 63, 69, 94, 96.  
 Richard's Pipit in Norfolk, 17.  
 Rivulet Moth, 68, 113.  
 Robin at Ease, 89.  
 Rooks, 209.  
 Rooks and *Arum maculatum*, 166.  
 Rosemary and Rue, 39, 40, 67.  
 Rue and Rosemary, 39, 40, 67, 118.  
 Rue in Nosegays, 118.

SACKBUT, 71, 89, 95.  
 Sacrificial Stone, 21.  
 Sagacity of Bees, 65.  
 Sagacity of Rats, 66.  
 Salmon, Age of the, 233.  
 Samphire, 263.  
 Sample Post and Nat. History Specimens, 261.  
 Sandfly and its Parasite, 99.  
 Sandstone, Story of a Piece of, 265.  
*Sanguinaria Canadensis*, 19.  
*Saprolegniaceæ*, Bibliography of, 67.  
*Saxifraga hypnoides*, 19.  
 Scales of the Bleak, 187.  
 Scales of the Chub, 92.  
 Scales of the Crucian Carp, 235.  
 Scales of the Prussian Carp, 279.  
 Scales of the Snig Eel, 280.  
 Scales of the Tench, 140.  
 Scavenger Beetles, 143.  
 Scene in the New Forest, 262.  
 Scotch Thistle, the, 131.  
 Sea Beet, the, 100.  
 Sea Birds near Guildford, 95.  
 Sea Cucumbers, 137.  
 Sea-gulls inland, 138.  
 Sea Hare, 113, 185.  
 Sea, Locusts at, 175.  
 Sea Urchins, 150.  
 Seed-leaves, Accidental Variations of, 145, 226.  
 "Sembling" of Moths, 153, 174, 213.  
 Sepiostaire, 177.  
 Sharking, 209.  
 Sheep, 46.  
 Shell-flower, 188, 238.  
 Shells, Cleaning, 190, 214.  
 Shells, New British, 130, 138, 161, 277.  
 Shrew, the, 136.  
 Siliceo-fibrous Sponges, 37.  
 Silk-moth, Yama-mai, 18.



Silkworms, New Food for, 18.  
 Silkworm, Wild Chinese, 134.  
*Silybum Marianum* near Olney, 186.  
 Singular Emergence of Fleas, 259.  
 Sky, the Midnight, 55.  
 Slate, Story of a Piece of, 205.  
 Slowworm, the, 42.  
 Small Egg, 212, 259.  
 Smew, the, 95, 110, 137.  
 Smother Flies, 249.  
 Snake-killing Iguana, 166.  
 Snake Skin, 45.  
 Snipe Food, 42.  
 Snipe, the Solitary, 65.  
 Snow Bunting, the, 71, 90, 114.  
 Snow, Insects on, 263.  
 Soirée of Quekett Club, 92.  
 Solitary Snipe, 65.  
 Something like a Swarm of Flies, 65.  
 Sounding-lead, 189.  
 Sounds produced by Insects, 64.  
 Sparrow, Varieties of, 60.  
 Species, Mutation of, 162.  
 Spectrum of the Firefly, 117.  
 Speculators, Facts for, 263.  
 Speech, on some Anomalies of, 165.  
*Sphinx atropos*, 114, 161.  
*Sphinx ligustri*, 90.  
 Spider, Singular Death of a, 237.  
 Spider, the Flying, 237.  
 Spiders and Larvæ, 94, 117.  
 Spiral Crystals, 47.  
 Spiral twist in Chestnut-trees, 237.  
 Spiral Vessels, 119, 142.  
 Sponges, Common British, 172.  
 Sponges, Siliceo-fibrous, 37.  
 Spontaneous Generation, 235.  
 Spotted Sulphur-moth, 184.  
 Spring Visitors, 138.  
 Spur-winged Goose in Wiltshire, 51, 95.  
 Squirrel, 191.  
 Squirrel, the, Does it suck Birds' Eggs? 281.  
 Starch of Calabar Bean, 68.  
 Starches, mounted, 279.  
 Starlings, 277.  
 Statoblast of Plumatella, 274.  
 Sticklebacks, 137.  
 Stigmas (?) of Conifers, 142.  
 St. Mary's Redcliff, Bristol, 23.  
 Stone, the Sacrificial, 21.  
 Story of a Piece of Granite, 169.  
 Story of a Piece of Limestone, 217.  
 Story of a Piece of Sandstone, 265.  
 Story of a Piece of Slate, 205.  
 Strange Bees, 141, 161.  
 Striped Hawkmoth at Brighton, &c., 161, 229, 233.  
 Studies from the Antique, 14, 45, 71.  
 Study of Natural History, 112.

Suggestion, 165.  
 Sundew, Hairs of the, 111, 212.  
 Sun, the Fuel of the, 101.  
 Sussex Mosses, 139.  
 Swallows, 90.  
 Swallows' Nests, 191.  
 Swarm of Beetles, 233, 263.  
 Swifts in September, 263.  
 Synonymy, Botanical, 95.  
*Symphytum tuberosum*, 19, 34.  
  
 TAMPICO JALAP, 142.  
 Teal, Nesting in Hampshire, 66.  
 Teal, the, 35.  
 Tench, Scales of the, 140.  
 Termites or White Ants, 185.  
*Testacella*, 214.  
 Thistles at the Antipodes, 162.  
 Thistle, the Scotch, 131.  
 Three-leaved Branches, 250.  
 Thrips, to Destroy, 17.  
 Throbbing Stones, 142.  
 Tiger-bird, 188, 238.  
*Tillandsia*, Hairs of, 116.  
*Tinea granella*, 66.  
 Titmouse, the Bearded, 65, 95.  
 Titmouse, the Cole, 42.  
 Titmouse, the Longtailed, 17.  
 Titmouse, the Marsh, 18.  
 Toad-flax, the Ivyleaved, 43, 71.  
 Toads devouring Bees, 117, 141, 142, 161, 164, 166.  
 Tongue of the Hornet, 163.  
 Torquay, Rare Plants at, 43, 139, 165.  
 Touchen Leaves, 262, 281, 282.  
 Towing Net, the, 193, 227.  
 Transparent Painting on Glass, 213.  
 Traveller's Delight, 188, 215, 237, 261.  
 Trees, Vast Variety of, 19.  
 Tree, the Locust, 271.  
 Tricotyledonous Embryos, 115, 139, 145, 226.  
*Turdus pilaris*, 13.  
 Turn-table, Improved, 163.

UNITED BRANCHES, 254, 283.  
 Universe, Forces of the, 258.  
 Unmounted Objects, 216.  
 Unwelcome Guest, 141.  
 Upas-tree, the, 214.  
*Uria lachrymans*, 95.  
*Ustilago antherarum*, 160.

VAGINICOLA, FRESH-WATER VALVED, 33.  
*Vaginicola valvata*, 33.  
*Vallisneria spiralis*, 166, 189, 212, 215, 237.

*Vanessa Antiopa*, 209.  
 Variations in Leaves, 214.  
 Variations in Seed-leaves, 145, 226.  
 Varieties of Sparrow, 60.  
 Ververd, 94, 119, 141.  
*Veronica Buxbaumii*, 43, 91, 186.  
 Vessels, Spiral, 119, 142.  
*Viburnum Lantana*, 187.  
*Viburnum Opulus*, 91.  
 Victoria Regia Water-lily, 279.  
 Vinegar-plant, the, 144.  
 Violets, 67.  
 Viper swallowing its Young, 223.  
 Visitors, Spring, 138.  
 Vitality of Eggs, 191.  
 Viviparous or Oviparous, 70.  
 Volcano Fish, the, 25.  
 Vulcanite Cells, 20, 282.  
  
 WAFFEL, 261, 281.  
 Wakon Bird, 188.  
 Wasp, Crystals in, 45, 70, 71.  
 Wasps and Bees—Do Toads eat them? 117, 141, 142, 161, 164, 166.  
 Water-beetle Music, 236.  
 Water Bugs, 188.  
 Weasels, 161.  
 White Ants, or Termites, 185, 263.  
 Who'd be a Butterfly? 143.  
 Wild Cat, Ferocity of the, 63.  
 Wild Chinese Silkworm, 135.  
 Wiltshire, Spur-winged Goose in, 51, 95.  
 Winged Aphides, 249.  
 Wingless Insects, 49, 105, 126, 164.  
 Winter Martin, 270.  
*Wolffia arrhiza*, 91.  
 Wood-Leopard Moth, 178.  
 Woodlouse, the, 41.  
 Woodpecker, Greater Spotted, 184.  
 Woodpecker, the Green, 212, 281.  
 Wood, Preserving, 164.  
 Woodruff, the Sweet, 47, 69, 70, 93.

*Xylophasia polyodon*, 32.

YAFFEL, 215, 236, 261, 281.  
 Yama-Mai Silk-moth, 18.  
 Yoppingal, 119.  
 Yorkshire, Diver in, 83.  
 Young Oysters, how to Prepare for the Microscope, 140.

ZEAL MAYS, 43.  
*Zeuzera Aesculi*, 178.  
 Zinc Troughs for Bees, 142, 167.  
*Zonites glaber*, 161, 277.  
 Zoology, a Manual of, 101.

















